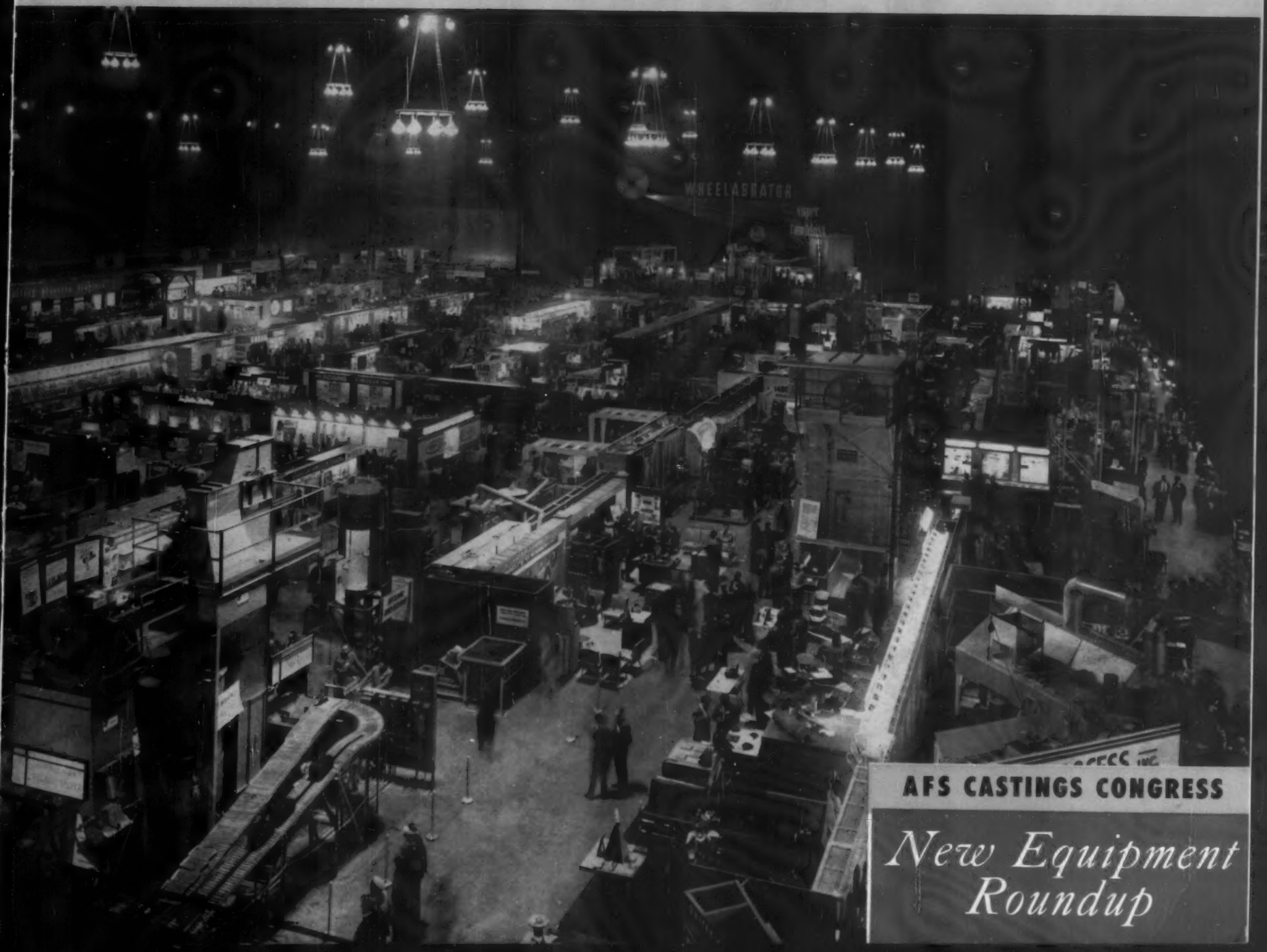
modern castings

Owned by the men who Buy

JUNE 1956

CONVENTION REPORT ISSUE



AFS CASTINGS CONGRESS

New Equipment Roundup

future meetings and exhibits

JUNE

4-8 . . American Foundrymen's Society, *LaSalle Hotel, Chicago. Technical Committee Week.*

5-8 . . Materials Handling Institute. *Public Auditorium, Cleveland. Materials Handling Exposition.*

6 . . American Foundrymen's Society, *LaSalle Hotel, Chicago. Technical Council.*

11-12 . . Malleable Founders' Society, *The Homestead, Hot Springs, Va. General Society Meeting.*

14-16 . . American Foundrymen's Society, *Kellogg Center, Michigan State University, East Lansing, Mich. Education Seminar.*

17-22 . . American Society for Testing Materials, *Chalfonte-Haddon Hall, Atlantic City, N. J. 59th Annual Meeting.*

18-29 . . Metallurgy of Iron & Steelmaking, *Massachusetts Institute of Technology, Cambridge. Special Summer Program.*

24-26 . . Alloy Casting Institute, *The Homestead, Hot Springs, Va. Annual Meeting.*

28-29 . . American Foundrymen's Society, *LaSalle Hotel, Chicago. 13th Annual Chapter Officers' Conference.*

SEPTEMBER

1-9 . . International Foundry Trades Fair and 23rd International Foundry Congress, *Dusseldorf, Germany. Hosts: Association of German Foundrymen, Industrial Association of the Foundry Industry, Foundry Machinery Trade Association, and Joint Association of German Metal Foundries.*

11-13 . . American Die Casting Institute, *Edgewater Beach Hotel, Chicago. Annual Meeting.*

17-21 . . Instrument Society of America, *New York Coliseum, New York. 11th Annual Instrument-Automation Conference & Exhibit.*

24-25 . . Steel Founders' Society of America, *The Greenbrier, White Sulphur Springs, W. Va. Fall Meeting.*

24-26 . . Material Handling Institute. *The Greenbrier, White Sulphur Springs, W. Va. Fall Meeting.*

25-28 . . Association of Iron and Steel

Engineers, *Public Auditorium, Cleveland. Iron and Steel Exposition.*

OCTOBER

4-5 . . **Magnesium Association,** *Drake Hotel, Chicago. Annual Convention.*

8-12 . . American Society for Metals, *Public Auditorium, Cleveland. National Metals Congress & Exposition.*

11-12 . . **National Foundry Association,** ***Detroit. Annual Meeting.***

11-12 . . Armour Research Foundation, Illinois Institute of Technology, *Hotel Sherman, Chicago. National Noise Abatement Symposium.*

18-20 . . **Foundry Equipment Manufacturers' Association,** ***The Greenbrier, White Sulphur Springs, W. Va. Annual Meeting.***

20-23 . . Conveyor Equipment Manufacturer's Association, *The Greenbrier, White Sulphur Springs, W. Va. Annual Meeting.*

29-30 . . Refractories Institute, *The Homestead, Hot Springs, Va. Fall Meeting.*

30-Nov. 2 . . **Gray Iron Founders' Society,** *The Homestead, Hot Springs, Va. Annual Meeting.*

31-Nov. 2 . . Industrial Management Society, *Hotel Sherman, Chicago. Time and Motion Study and Management Clinic.*

NOVEMBER

7-9 . . **Steel Founders' Society of America,** *Carter Hotel, Cleveland. Technical & Operating Conference.*

8-9 . . All-Canadian Foundry Conference, *Mount Royal Hotel, Montreal, Que. Sponsored by Eastern Canada and Ontario Chapters of the American Foundrymen's Society.*

26-30 . . Third International Automation Exposition, *Trade Show Bldg., New York.*

29-30 . . Michigan Regional Foundry Conference, *University of Michigan, Union Bldg., Ann Arbor, Mich. Sponsored by the Detroit, Saginaw Valley, Central Michigan, and Western Michigan Chapters and the University of Michigan and Michigan State University Student Chapters of the American Foundrymen's Society.*

Answer questions by sending for data describing the newest products and processes. Order by using the cards on **page 21-22.**

Casting Thermo

■ Recent investigations have been aimed at finding a suitable method of study of casting thermodynamics. Much time has been spent investigating liquids which would freeze at approximately room temperature. J. G. Kura and R. M. Lang, Battelle Memorial Institute, have turned up with a casting made of diphenol which freezes rapidly at room temperature with a crystalline structure. A broken section shows that columnar grains grow from opposite surfaces of the section, meeting at the center.

The Light Metals Division Research Committee of the American Foundrymen's Society has recommended that further attention be given to other methods of approach, including the use of radioactive materials of suitable half life.

We've simplified things for you.

ACIL Index Enlarged

This year's edition of the Directory of the American Council of Independent Laboratories, Inc., has a new feature: Index of Services and Facilities which lists over 400 categories of services.

The geographical listing is supplemented by the code system in the Index of Services. This system keys each laboratory performing a specific function as to location by area of the country.

The ACIL headquarters is at 4302 East-West Highway, Washington 14, D. C.

BONUS SECTION

june, 1956
vol. 29, no. 6

modern castings

in this issue

regular departments

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VAnderbilt 4-0181

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MODERN CASTINGS is indexed by Engineering Index, Inc., 29 West 39th St., New York 18, N. Y. and microfilmed by University Microfilms, 313 N. First St., Ann Arbor, Mich.

Published monthly by the American Foundrymen's Society, Inc., Golf & Wolf Roads, Des Plaines, Ill. Subscription price in the U.S., Canada and Mexico $3.00 per year; elsewhere, $6.00. Single Copies 50c. May and June issues $1.00. Second-class mail privileges authorized at Pontiac, Illinois. Additional entry at Des Plaines, Ill.

AUDITED PAID CIRCULATION ABC

TIPS, TRENDS AND TECHNIQUES

Once upon a time (it was May 3 through 9 this year if you're fussy about details) there was a Design Engineer who found himself in Atlantic City. Weather and temperature weren't conducive to bathing or even girl watching so he went to the Auditorium where he'd heard there was an interesting Exhibit put on by a bunch of Foundrymen. Like most Design Engineers he didn't know much about Castings, the people who produce them, or the methods and equipment they use. So he went to the AFS Castings Congress & Show.

■ He was mightily intrigued by the Ingenious Devices people like himself had engineered for production of Better Castings faster, with less effort, under better working conditions. It puzzled him despite his meager acquaintance with Castings, to see that his fellow design engineers were missing Opportunities to use Castings on the Equipment designed to produce them.

■ Some time during World War II he'd heard that the Foundry was a hot, heavy, dirty place to work but had been disabused of the idea by a Foundryman who pointed out that the statement was merely the mouthing of a badly informed Public Official. Now the Design Engineer wondered if the Foundryman knew what he was talking about. The Foundryman had said that you have to handle 100 to 300 tons of Material and Equipment for every ton of Castings produced. How could the Foundryman do it without more Materials Handling Equipment than was exhibited, the Design Engineer wondered.

■ With more time than many Foundrymen evidently had, the Design Engineer attended the Annual Meeting and heard Sil Massari suggest in his Hoyt Memorial Lecture that AFS make it a real Castings Congress by broadening the Market Opportunities of Foundrymen by permitting them to display Castings. This Idea was one of the Bright Spots of the week for the Design Engineer because he would have enjoyed learning more about Castings and what they can do for him.

■ Out on the Boardwalk the Design Engineer fell in step with a Friendly Foundryman and they became so interested talking to each other that they walked all the way to Cap Starn's and had to thumb a ride back on a Helicopter which was making frequent landings in front of the Auditorium. While they were talking, the Design Engineer said that on the basis of the equipment exhibited he figured that about 42% of the castings output must be made in shells, about 8% in CO_2-silicate bonded sand, and about 50% in green sand.

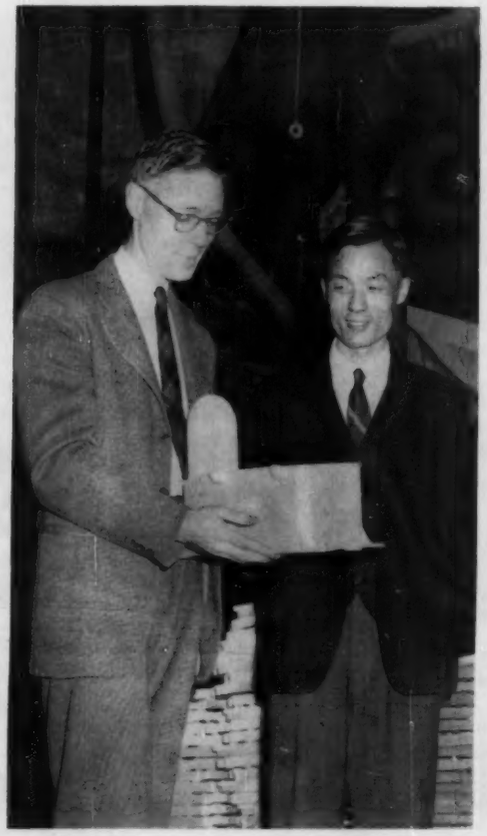
■ The Friendly Foundryman said that's about what anyone might think at first glance, particularly if he didn't know the Castings Industry. Sand castings, he said, are the Workhorse of Manufacturers and if you want to judge production on the basis of exhibits you should figure in all the fellows who make flasks, jackets, binders, chills, chaplets, facings, and the like. Making a quick calculation based on the Program which listed all the Exhibitors, the Friendly Foundryman came up with 12% for shell, 8% for CO_2, and 80% for green sand. That's probably low for green sand and it doesn't include die and permanent mold castings which are made despite the almost complete absence from the Exhibit of equipment for producing them, he said.

■ The Design Engineer left Atlantic City with a greater appreciation of Castings and the Industry that makes them, and the hope that a little Right Thinking on the part of the Castings Industry would someday provide him with the Information he needs to do a better job of Designing through use of Castings.

modern castings album

Pouring off the heat doesn't take a lot of time when your cupola has an ID of only 3½ in. These FEF students at the University of California, Berkeley, constructed theirs from plans drawn by Fred C. Barbour and W. M. Spradlin of McWane Cast Iron Pipe Co., Birmingham, Ala. Just to the left of the cupola stack can be seen a page from AMERICAN FOUNDRYMAN (MODERN CASTINGS) that told the story of the operation and construction of the original unit constructed by these men. Pouring off this heat are, left to right, Dan Bloom; Prof. E. Paul De Garmo, professor in charge of FEF; Andrew Wortman; John Schwabacher; and John G. Fulbright.

Two Formosan engineers have recently been studying U. S. Foundries. HunKen Chiang, right, checks a casting with G. B. Mannweiler of Eastern Malleable Iron Co. Chiang operates an iron and steel foundry for the Taiwan Aluminum Corp. Henry Chih-Sin Chen, above, visited AFS headquarters to select AFS publications for his library at the Kao-Hsiung foundry of the Taiwan Machinery Mfg. Corp. Chen is vice-chief engineer and foundry manager. Both are touring under the auspices of the International Cooperation Administration.



Perfect safety record for a year of continuous operation brought the Zenith Foundry Co., West Allis, Wis., an award from its compensation insurance carrier. This is the third year the employees of the gray iron plant have won such an award. Thomas H. Tanner, Vice-president, accepted the award from Myron Koceja, Employers Mutuals of Wausau, as P. B. Iattoni, foundry superintendent, and Mrs. Agnes Vance, company nurse, watched.

Radiography Has Five Foundry Uses

■ Radiography is valuable in at least five types of foundry operations, the Brass and Bronze division of AFS was told during the Atlantic City Castings Congress. Authors of the paper, "Application of Radiography in the Manufacture of Bronze Castings," are N. A. Kahn, Solomon Goldspiel, and R. R. Waltien, all of the New York Naval Shipyard, Brooklyn.

Radiography can assist foundrymen in the following ways:

■ **Determining the adequacy of gates and risers.** Foundrymen are able to evaluate the efficiency of a gating and risering system by noting the type, location, and amount of shrinkage shown on a radiograph. They can also plan modifications calculated to overcome the defects noted on the radiograph.

■ **Evaluating the soundness of castings.** An experienced technician can evaluate a casting by comparing its radiograph to suitable standards predetermined on a basis of service requirements.

■ **Inspection.** Radiography enables the inspector to remove from the production line castings which appear sound on the surface but which might show defects after machining. In some cases these can be sorted out into such categories as sound, repairable, rejects.

■ **Salvage.** Some types of bronzes cannot be repaired but in those that can radiography is indispensable in planning and following up the defect removal and in verifying the soundness of the repair weld. The original inspection radiograph is used to locate the defective area and after removal and repair, to check the completeness of removal of the defect, and later to prove the final soundness of the weld.

■ **Procurement.** In buying castings, radiography may be specified in the purchase contract to be performed by the foundry, the buyer, or by an independent laboratory.

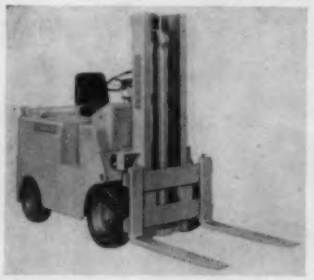
Industrial radiography utilizes other radioactive media in addition to X-rays to study the internal soundness of metals. Of these, radium is the most popular, partly because its gamma-rays possess greater penetrating power.

products and processes

Monorail blast cleaner handles cleaning problems involving parts with internal open cavities, engine blocks for example. An airless abrasive blast cleaner, it has a single hurling wheel. But this wheel throws abrasive at critical areas at all times. Work-holding hooks turn the piece without sway. *Wheelabrator Corp.*

CIRCLE NO. 1, PAGE 21-22

Fork truck series, called "Pace-Makers, include gas, LP-gas, and diesel powered models in 5 types. All feature functional styling, added engine power, greater driving comfort. Stand-



ard or automatic transmission is optional choice, as is power steering. Maximum capacities range to 11,000 lbs. *Towmotor Corp.*

CIRCLE NO. 2, PAGE 21-22

Die casting machine, one of the largest ever made for general industry, weighs 79,000 lb with 10" thick solid steel die plates each weighing over 10,000 lb. Model BH-60 comes in a plunger gooseneck design for zinc, or as a cold chamber design for aluminum and magnesium. It's capable of injecting up to 49 lbs of zinc and over 14 lbs of aluminum with only the movement of electric push buttons for fully automatic cycle of operation. *Kux Machine Co.*

CIRCLE NO. 3, PAGE 21-22

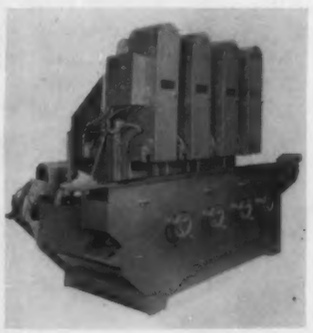
Temperature controller is of the indicating and regulating pyrometer type for use with chromel-alumel, iron-constantin, and platinum-10% rhodium thermocouples. Control operates on a photo-electric principle, eliminating moving parts and contact wear. The unit can be set for automatic continuous maintenance of desired temperature within ½% limits. It can also be used as a limiting control. *Jelrus Co.*

CIRCLE NO. 4, PAGE 21-22

Cold setting binder called "Kold-Set" is a formulation of oils which are added to sands to give hard, non-deforming cores and mold surfaces. Advantages claimed include no ramming; 50 to 60% of the rodding is reduced under normal core making procedures; rough cleaning time is eliminated; core surfaces have uniform hardness; accurate core sizes are maintained; sand life is controlled and handling simplified. *G. E. Smith, Inc.*

CIRCLE NO. 5, PAGE 21-22

Four-head belt grinder permits four simultaneous grinding operations. Designed for high-volume flat surfacing of ferrous and non-ferrous metals, glass, plastics, and ceramics, Model 680-4 makes possible a one-cycle operation from rough casting to polished part. Each head has its own belt, which can be set for progressively finer work. It will handle pieces 5"



high, 6" wide, and any length. Weight: 5500 lbs. It has power enough to take off .020" of steel stock in one pass. *Engelberg Huller Co.*

CIRCLE NO. 6, PAGE 21-22

Storage racks are put up without drilling or welding. Premeasured and prepainted, they are fully reuseable.

Three bolts at every adjustment point insure rigidity of the Universal Slotted Angle System. *FlexAngle Corp.*

CIRCLE NO. 7, PAGE 21-22

Visual monitor can be adapted to many sensing jobs. For monitoring a cupola, it can show what's going on by using suitable transducer elements to sense pressure, temperature, and air volume. The unit can handle

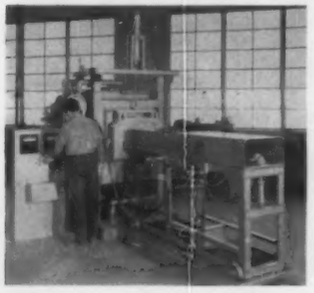
24 separate parameters. Spots of light moving vertically on 24 adjacent scales are followed by eye. Bulletin CGC-309. *Century Electronics & Instruments, Inc.*

CIRCLE NO. 8, PAGE 21-22

Floor resurfacer has been developed to resist acids, alkalis, water, oil, grease. Rockflux goes over new, wet concrete or patches old floors at ½" or more. It has three times the compressive strength and four times the serviceability of concrete. You just add water, trowel it on, and let it set for 24 hours. *Flexrock Co.*

CIRCLE NO. 9, PAGE 21-22

Aluminum melting furnace, a non-tilting type, has an automatic loading tray that eliminates throwing metal against refractory. The operator need never be in close contact with furnace heat. The furnace is basically like other Eclipse dry hearth units except that burners fire vertically from the furnace roof. The operator loads risers, gates, and ingots into the



loading tray. When the furnace is ready for recharging, an air valve loads the metal automatically. *Eclipse Fuel Engineering Co.*

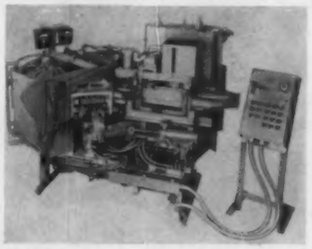
CIRCLE NO. 10, PAGE 21-22

Work glove line incorporates 15 design innovations. Each glove in the Pacemaker line is made of neoprene-

coated flannel in three different weights. There is a choice of knit wrist of gauntlet styles. These gloves offer extreme resistance to chemicals and abrasion. *Pioneer Rubber Co.*

CIRCLE NO. 11, PAGE 21-22

Hollow core machine designated Model SC-10-R automatically turns out accurate, ready-to-use cores in



large volume. Its cycle is at most 15 seconds. It holds 6 core boxes up to 10 by 12 by 6" each. Everything is automatic except removing the finished cores. Bulletin SC-100 tells all. *SPO. Inc.*

CIRCLE NO. 12, PAGE 21-22

Overhead stacker crane shows up best wherever a highly flexible and versatile crane is needed. The unit consists of a double-girder bridge with a telescoping type, fork-lift stacker trolley. Frame that holds the column has full-circle turning. Units come with capacities to 10 tons and lifts 20', in cab or floor control models. *All-State Engineering Co.*

CIRCLE NO. 13, PAGE 21-22

Heavy-duty vacuums now come with stainless tanks as well as standard enamel-finished tanks. Instead of grey,

enamelled units now have a complete new color restyling; some design changes have improved the units. *Premier Co.*

CIRCLE NO. 14, PAGE 21-22

Maize cellulose, an organic grit and meal is used for drying, polishing, burnishing, filler, carrier, conditioner,

and absorbent; and as ingredients for compounds and for polishing by air blast. Available in wide choice of sizes. *Karr-Maize Div.*

CIRCLE NO. 15, PAGE 21-22

Electric furnaces for labs or small heat treating applications heat to 2000 F in just an hour. Temperature range is from 300 to 2000 F in one series, and from 400 to 2300 F in a

second series. Some operate on 110 volts. Stock sizes are 4½ by 4¼ by 6″ deep, and 6 by 6 by 6″ deep. Others run to 6 by 6 by 18″ deep. Zone gradient control is featured. *L & L Mfg. Co.*

CIRCLE NO. 16, PAGE 21-22

Cut-off machine is available for use with a dry-cutting abrasive wheel for rod, bar and tubing stock, and with high-speed saw blades or conventional wood-cutting blades. It's true and clean cut eliminates many finishing steps. Wheels and blades to 12″ will fit; power comes from a 3 hp 220-440 volt motor. *Walker-Turner, Inc.*

CIRCLE NO. 17, PAGE 21-22

Lubricant in an aerosol can is the latest wrinkle in oiling. Compound is an instant drying graphite suspension for metallic and non-metallic surfaces. Spray Graph works at tem-

peratures from 100 below to 800 F. There is no surface buildup or dripping. Each can holds 6 ounces. *American Resin Corp.*

CIRCLE NO. 18, PAGE 21-22

Storage batteries for stationary power applications come in heat-resistant polyethylene cases. Major improve-

ments have been provided for longer life, higher instantaneous discharge rates, less maintenance, better sealing, and ready adaptability to cycle or float service. Spacing between plates of opposite polarity consists of one-piece polystryene dowels and microporous rubber separators. The plastic dowels insure perfect alignment between plates. Each positive plate consists of a cast lead antimony grid into which buttons of pure lead are permanently locked and then coated with lead peroxide. Name: Exide-Manchex battery. *Electric Storage Battery Co., Exide Industrial Div.*

CIRCLE NO. 19, PAGE 21-22

Rotary grinders have double the power of their predecessors. Two models, 3G and 3GE, come in 5 versions based on motor speeds of 7, 10, 12, 15, and 18,000 rpm. Intended for precision work, they're air-operated, weigh under 4 lbs, are under 12" long, and work at 90 psi pressure. They feature thumb-twist throttles for accurate control. They have such new features as automatic head oiler, built-in muffler, and adjustable governor. *Thor Power Tool Co.*

CIRCLE NO. 20, PAGE 21-22

Cupola flux is reported to give cleaner iron, hotter iron, lower cupola repair cost. Superflux is a scientifically compounded fluorspar base, brick type deal with ingredients chosen for high fluxing qualities. Deep V-notch makes it easy to break into 2-lb chunks. Superflux also comes in 4-block slabs for extremely large cupolas. *Superflux Mfg. Co.*

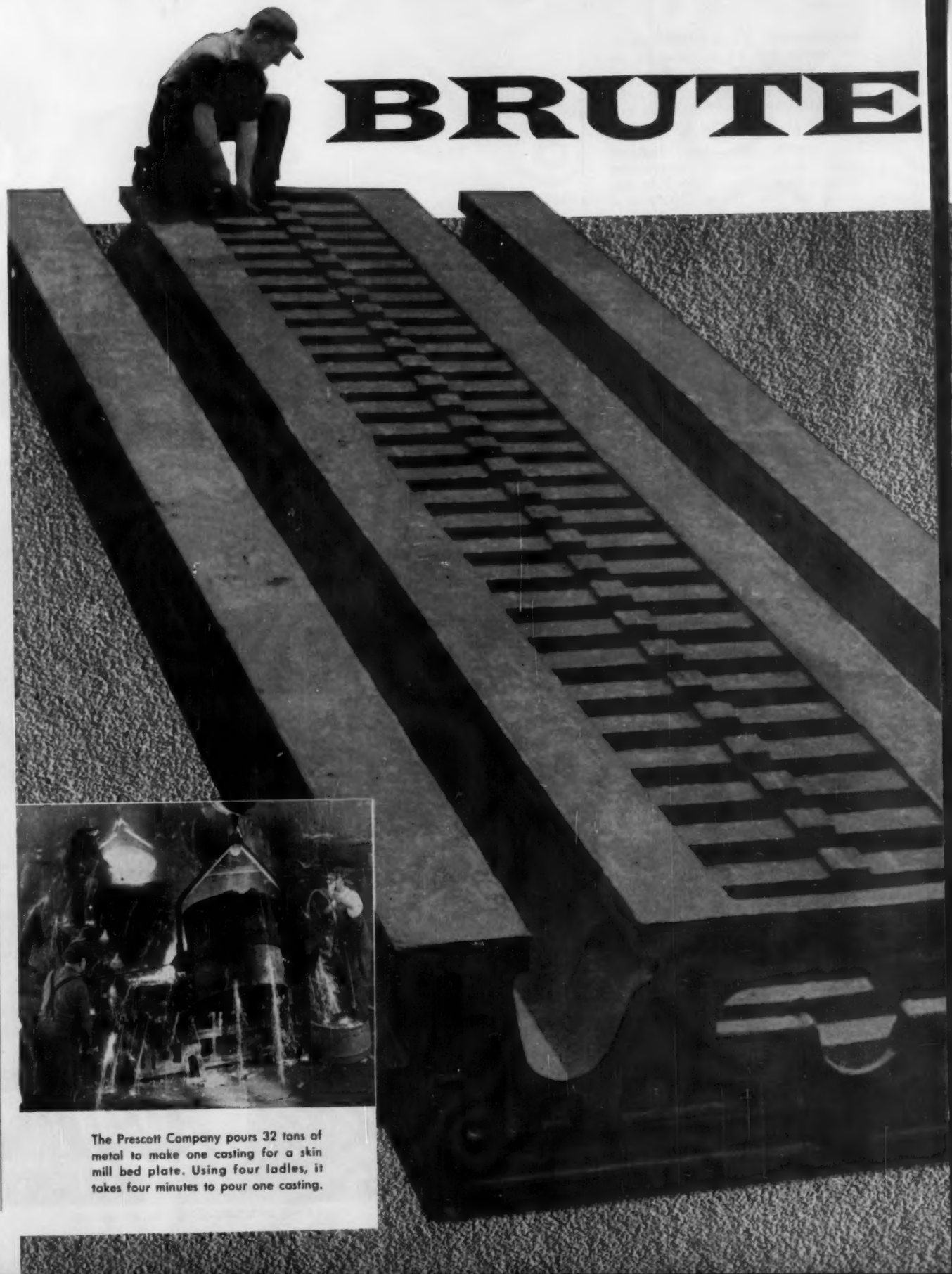
CIRCLE NO. 21, PAGE 21-22

Multiple creep rupture tester of the lever type holds four specimens simultaneously under loads to 4000 lbs. Four-unit electric furnace holds specimens under any temperature to 1800 F. Running time counters totalize to 10,000 hours in 0.1-hr intervals. Compound lever system gives a load ratio of 50:1. Specimens can be loaded in increments of 5 lbs. Furnace and grip assemblies are on the front, controls and recorder on the back. Units measure 29 wide by 46 deep by 85" high. *Baldwin-Lima-Hamilton Corp.*

CIRCLE NO. 22, PAGE 21-22

Noise analyzer called "Soundscope" is allegedly the first to combine in one unit the 4 items required for noise analysis. It measures overall sound levels as well as sound in each of 8 octave bands to determine noise peaks. Each frequency band is studied individually to locate the potenti-

CIRCLE NO. 169, PAGE 21-22



The Prescott Company pours 32 tons of metal to make one casting for a skin mill bed plate. Using four ladles, it takes four minutes to pour one casting.

ally harmful noise sources. Because the 20-lb machine is portable, self-contained, and simple to operate and interpret, its widest use is in industrial noise prevention to combat occupational loss of hearing. *Mine Safety Appliance Co.*

CIRCLE NO. 23, PAGE 21-22

Fume remover also knocks out odors, and microscopic solids. The Type A Hydro Precipitator Scrubber will remove low and sub-micron particles from exhaust gases at extremely high efficiency. In tests, the unit has performed at 99.8% efficiency with dust loading at 5 grains per cu ft and 70% of this material below 5-micron particle size. Water is used to wet, trap, separate and force solids to the bottom. *Johnson-March Corp.*

CIRCLE NO. 24, PAGE 21-22

Additive for wet dust collectors keeps them at peak efficiency by ending manual cleanouts, preventing hard deposits from forming, neutralizing acidity, blocking corrosion and foaming. "Mogul" users report cleaning time cut from 8 to ½ hr per 40-hr cycle. *North American Mogul Products Co.*

CIRCLE NO. 25, PAGE 21-22

One-ton fork truck with a single mast for better visibility has rubber tires. Specific operating advantages include faster load placement, less driver fatigue, greater safety. Compactness is teamed with maneuverability for working close quarters. All hydraulic attachments fit the QN-20 Monomast. *Hyster Co.*

CIRCLE NO. 26, PAGE 21-22

Abrasive belt machine can perform any of the applications of a grinder, polisher, or deburrer, The extension arm assembly rotates full circle on the motor hub. Unit features ruggedness, a totally enclosed motor, sealed ball bearings, automatic spring loaded belt tensioning, and positive belt tracking. The big point, of course, is its flexibility of use. Model DBA-1F is detailed in Bulletin A 1357. *Curtis Machine Corp.*

CIRCLE NO. 27, PAGE 21-22

Double-faced tapes for laminating and splicing operations are thin but tough. Dubbed "Permacel" 94 and 941, they are made with polyester Mylar for backing, with heat curing adhesive which has excellent pressure sensitive characteristics. With a heat cure, it becomes resistant to paint and varnish solvents. Their inert

CIRCLE NO. 169, PAGE 21-22

nature and thinness suit them for splicing where further processing is involved. Important phsycial data: 40 oz/inch width adhesion to steel; 20 lb/inch width tensile strength, and 70 per cent elongation. They come in sizes from ¼ to 23". *Permacel Tape Corp.*

CIRCLE NO. 28, PAGE 21-22

Timestudy board with removable stopwatch holder is made of smooth, black, nonbreakable plastic. It measures 13 x 12 x ⅛"; arm and body cutouts give perfect fit. Stopwatch holder is plated steel with one-screw adjustment. Absolute firmness is assured. Watch can be wound while still in the holder. Movable clip at top of board holds data sheet firmly and neatly. *M. Ducommun Co.*

CIRCLE NO. 29, PAGE 21-22

Hardness tester is something new: a motorized machine which automatically indicates the diameter of the Brinell impressions. In production, the operator can see at a glance whether the ball impression lies between preset limits. Loads are applied by dead weight, through motor drive with cycles from 5 to 60 seconds. Test loads range from 120 to 3000 kg. Vertical clearance is 16", horizontal reach is 8", net weight is about 900 lb. Standard operation on 220 volts, 3 phase current. *Gries Industries, Inc.*

CIRCLE NO. 30, PAGE 21-22

Corebreaker is used as an air-cushioned piston hammer to deliver a powerful blow with little vibration. Large cores are easily shattered, even though the unit weighs only 22 lb and is 19" long. It operates on 80-95 psi and uses little air. One-bolt retainer construction permits quick and easy chisel changes. Model CB27. *Le Roi Div., Westinghouse Air Brake Co.*

CIRCLE NO. 31, PAGE 21-22

Conveyor belt for hot materials is made with glass fabric insulation. Chunks of metal heated to 1400° F won't burn holes through it. Fire Curtain belts have two plies of glass fabric that "float" in the top rubber cover. Hot metal chars the rubber only as far as the glass; overall strength remains as great as ever. *B. F. Goodrich Co.*

CIRCLE NO. 32, PAGE 21-22

Power trolley is for installation on electric hoists with capacities from 1000 to 2000 lbs. Known as the Series 600 Load Lifter, it complements the bigger units in the power trolley line. It's a lightweight, single speed push-button controlled unit. Speeds are either 65 or 100 fpm in traversing.

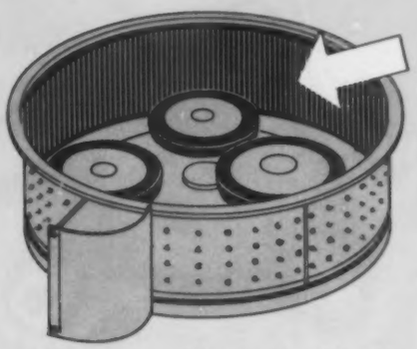
continued on page 125

CIRCLE NO. 171, PAGE 21-22

let the FACTS TALK

Why make a MYSTERY of foundry sand MULLING?

32.7 p.s.i. (Compared to 31.5 p.s.i.* in the latest slow-speed mixer).

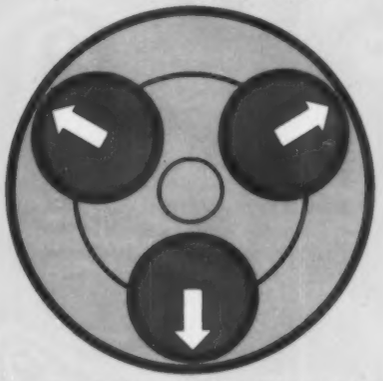


*using the same basis of computation

1 It's all a matter of PRESSURE

Mulling is simply the application of work energy to a sand mixture to completely distribute bonding materials in a uniform coating around the sand grains. The work is applied in the form of pressure and, in the Speedmullor, this pressure is applied by light-weight, horizontally-mounted, rubber-tired mulling wheels. Utilizing the modern principle of centrifugal force, the wheels of the Model "80" Speedmullor apply 32.7 p.s.i. to the sand as it is mulled in suspension between rubber-tired wheels and rubber-lined bowl. Not only is the mulling pressure greater, but non-slip rubber-to-rubber mulling provides far more effective non-crushing mulling action.

210,000 sq. inches per minute of area covered compared to 78,000 in the latest slow-speed mixer.



2 and AREA COVERED

The amount of mulling accomplished depends not only on the pressure but on the amount of sand to which that pressure is applied. The greater the *area* of sand covered, the greater the amount of sand mulled. The three high-speed mulling wheels of the Model "80" Speedmullor cover — by actual measurement — 210,000 sq. inches per minute. By exactly the same basis of measurement, the massive, necessarily slow moving mulling wheels of the latest style slow-speed mixer cover only 78,000 sq. inches per minute. Thus, the Speedmullor wheels apply full mulling pressure over *three times the mulling area* and thus do three times the mulling in any given time period. Since mulling can only be accomplished over the area covered, actual measurement gives the Speedmullor a clear three to one edge.

let the facts talk . . . 3 times the mulling with the SPEEDMULLOR

3

This clear superiority of three to one in favor of the Speedmullor means important savings for you. Savings in material are made possible by more thorough mulling. Savings in power costs are made possible by shorter time cycles for complete mulling. Savings in maintenance cost are made because of the lower loads of light-weight moving parts. You save on initial cost, too, because ton for ton on capacity, Speedmullors cost far less, and no expensive external aerators are required.

Use the reader service card in this magazine to request more data or write directly to:

BEARDSLEY AND PIPER
DIV. PETTIBONE MULLIKEN CORP.
2424 N. Cicero Avenue, Chicago 39, Ill.

THE WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF FOUNDRY MACHINERY

ION

UPOLINE • DURA PRODUCTS • WESTONITE

let the FACTS TALK

there's only one really PORTABLE MULLOR

1 ONLY THE SAND NEED BE MOVED ...NOT THE ENTIRE MULLOR

Once the Mulbaro barrow is loaded, it's moved directly to the Mulbaro for mulling and then directly to any point in the foundry. (The Mulbaro's light-weight, rubber-tired mulling barrows are wonderfully convenient for moving mulled sand to molders or coremakers). There's no need to move the entire mulling mechanism as with some so-called "portable" mixers. When you get right down to facts, no one wants to move a heavy mixer around the foundry — and there's really no need. With the Mulbaro, only the sand need be moved.

2 SAND IS HANDLED ONLY ONCE ...WHEN LOADING THE BARROW

Loading of the knee-high Mulbaro barrow takes only moments and that's all the sand handling required. There is no loading through a hard-to-reach — waist-high or higher — crib opening. No need to locate the Mulbaro right next to the unprepared sand, either. The Mulbaro can be spotted at the most convenient location and then the easy-to-move barrows are used to bring sand to and from the mullor.

3 AND ONLY THE MULBARO OFFERS THE DOUBLED OR TRIPLED CAPACITY OF OPERATION WITH SEVERAL BARROWS

With the Mulbaro, two or more barrows can be used with a single mulling mechanism. There's no need to have the mullor idle for loading or unloading. Capacity can be doubled or tripled at a very small additional cost, and the barrows serve as convenient sand containers for molders or coremakers.

Use the reader service card in this magazine to request more data or write directly to:

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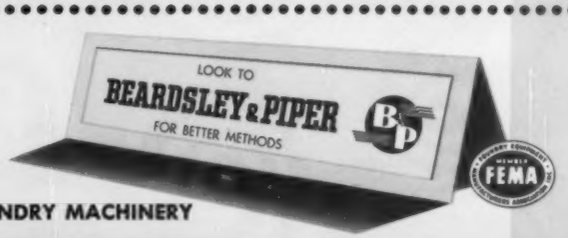
DIV. PETTIBONE MULLIKEN CORP.
2424 N. Cicero Avenue, Chicago 39, Ill.



THE WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF FOUNDRY MACHINERY

Sand Book Will Be Handbook

■ There'll soon be a new book on molding sand practices — a handbook, not another textbook. Many well-known foundrymen will contribute sections, giving their own practice. The text will be supplemented with photos and bibliography. Here's the way it's shaping up:

Chapter 1: Types of molds
- A. Sand
- B. Shell
- C. Investment
- D. Cement
- E. Plaster
- F. Permanent
- G. Ceramic, graphite, etc.
- H. Centrifugal

Chapter 2: Molding materials
- A. Sands
  1. Unbonded silica
  2. Bonded silica
  3. Zircon
  4. Olivine, coke, etc.
- B. Inorganic bonds
  1. Western bentonite
  2. Southern bentonite
  3. Fire clay
  4. Illite
  5. Cement, halloysite, etc.
- C. Organic bonds
  1. Cereal, dextrine, etc.
  2. Pitch
  3. Resins
  4. Core oil, etc.
- D. Additives
  1. Sea coal
  2. Silica flour
  3. Cellulose
  4. Iron Oxide
  5. Fuel oil, tar, etc.
- E. Water
- F. Coatings
- G. Partings

Chapter 3: Sand preparation units
- A. Mixing equipment
  1. Mullers
  2. Blade mixers
  3. Blenders
  4. Cutters
  5. Miscellaneous
- B. Auxiliary equipment
  1. Aerator
  2. Magnetic separator
  3. Cooling devices
  4. Dust control
  5. Screening
- C. Sand reclamation
- D. Sand storage

Chapter 4: Sand preparation
- A. Selecting ingredients
- B. Proportioning

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The AFS library is at the disposal of the AFS Sand Handbook Revision Committee (8-M). C. A. Sanders is chairman; J. E. Foster, secretary. Members are G. J. Biddle, R. L. Doelman, M. H. Horton, C. C. Sigerfoos, J. A. Wickett, D. C. Williams, H. J. Heine, H. W. Dietert, N. J. Dunbeck, W. O. McFatridge, S. A. Wick, E. C. Zirzow.

let's get personal

John B. Hinds . . has been promoted to position as specialist of planning and methods for General Electric Co.'s Elmira Foundry. Hinds will work to increase production of gray iron castings.

Horace Bringhurst . . for 23 years in foundry coke sales with Semet-Solvay Div., Allied Chemical & Dye Corp., has been named president and general manager of Superflux Mfg. Co. (formerly Weaver Block Co.).

William J. Martin . . has joined The Smith Facing & Supply Co., Cleveland, as sales manager. **Ray Crosby** will continue as sales and foundry engineer.

Harvey Black . . former president of Black's Gray Iron Foundry, has been appointed Shalco shell molding service manager for Southern Mill & Foundry Supply Co., Gastonia, N. C. He will be responsible for service of Shalco shell molding machines and shell core blowers in the southeastern states.

Al Fruchtl . . formerly of W. Thomas Barr Associates and past chairman of the Birmingham District Chapter, A.F.S., has joined the research and development staff of James B. Clow & Sons, Coshocton, Ohio. He will direct cast iron pipe process development.

William I. Matthes . . executive vice-president of the Arwood Precision Casting Co., Brooklyn, has been elected a director of the Investment Casting Institute, Chicago. Mr. Matthes was one of the pioneers in the field of investment castings.

L. W. Williamson . . foundry superintendent of Minneapolis Moline Co., Hopkins, Minn., plant will retire after 22 years with the firm and join Foundry Supply Co., Inc., of Minneapolis as a consultant.

Richard C. Meloy . . Pittsfield, N. Y., has been appointed G.I.F.S. marketing director. He will conduct a national program to assist members in broadening the uses and sales of gray iron castings through latest marketing techniques.

William H. Muchnic . . president of Locomotive Finished Materials Co. of Atchison, Kansas, has been elected a director of Rockwell Mfg. Co. LFM merged with Rockwell this February. Mr. Muchnic is a director of Steel Founders Society, and was once chairman of its product development committee.

Richard T. Nalle . . formerly president of The Midvale Co., Philadelphia, has been elected a director of F. J. Stokes Machine Co., also in Philadelphia. Mr. Nalle is a director

Harvey Black

Al Fruchtl

Wm. Muchnic

of York Corporation, Pennsylvania Salt Mfg. Co., Provident Trust Co. of Philadelphia, and Baldwin Securities Corp.

Albert F. Pfeiffer . . superintendent of the pattern shops for Allis-Chalmers Mfg. Co., was recently given a 50-year service award—he started work for Allis-Chalmers on February 6, 1906, in Scranton. Mr. Pfeiffer has

A. F. Pfeiffer

a truly enviable record in the foundry industry. Among other things, he is a past president of the Wisconsin Chapter of the American Foundrymen's Society, and a past national chairman of the Pattern Division of the society. Last year the A.F.S. awarded him an honorary life membership in the national alumni at their annual convention.

Stephen S. Conway . . president of the Brake Shoe & Castings Division of American Brake Shoe Co., has

S. S. Conway

been named a vice-president of the parent organization. Mr. Conway has been with the company since 1912.

A. P. Gagnebin . . has been appointed manager of the nickel sales department of International Nickel Co., New York. His assistant manager will

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be **Harold Larsen.** Both men have long been in responsible positions with the firm.

John Herbert . . has been appointed Shalco field service engineer for

J. Herbert

Southern Mill and Foundry Supply Co. in Gastonia, N. C. Herbert is a recognized expert on shell molding.

C. A. O'Neill

Clayton A. O'Neill . . has joined Wellman Bronze & Aluminum Co., Cleveland, as manager of its permanent mold division.

H. E. Little

Henry E. Little . . has been appointed general superintendent in charge of operations at the new Cleaver-Brooks plant now under construction at Lebanon, Pa.

Roy A. Jocobsen . . is now executive vice-president of Carondelet Foundry

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Co., St. Louis, Mo. Other changes at Carondelet include **John H. Culling** to vice-president in charge of plant operations; **Warren Brown** to vice-president in charge of sales; and **Milton W. Stanze** to secretary-treasurer.

G. E. Doherty . . will supervise the sale of Gunite wheels and brake drums in his new position as manager

G. E. Doherty

of distributor sales for Gunite Foundries Corp., Automotive Div., Rockford, Ill. Doherty has moved up steadily in the company since he joined it in 1942 as a draftsman.

David D. May . . is the new factory sales representative for Modern Engineering Co., St. Louis, Mo. With headquarters in Memphis, Tenn., Mr. May will cover the south central states for Meco oxy-acetylene welding and cutting apparatus.

A. L. Hunt

Albert L. Hunt . . has been appointed general manager of the St. Louis plant of National Bearing Div., American Brake Shoe Company.

John J. Foster . . has assumed his new duties as technical sales representative for Archer-Daniels-Midland Company in the Cleveland area.

Charles F. Barber . . has been appointed general counsel of American Smelting & Refining Company. This

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eases the load on **R. Worth Vaughan**, executive vice-president and former general counsel, who will now devote full time to his broadened executive responsibilities.

Robert Coady . . affiliated with Indiana Products Co. as sales engineer. The firm sells foundry clay, fire clay, fire brick, and foundry supplies. Mr. Coady will work out of Indianapolis.

H. C. Armstrong . . president of Williams & Co., Pittsburgh, was elected president of the Copper and Brass Warehouse Assn. recently. Other officers named are George D. Potter, Corey Steel Co., Cicero, Ill., vice-president; Norman Rosow, New York Brass & Copper Co., secretary; and Albert I. Gordon, Clifford Metal Sales Co., Providence, R. I., treasurer.

Harrison A. Price . . has been named director of commercial development for Harvey Aluminum, Torrance, Calif., primary metals producer.

Robert N. Hamilton . . has been named abrasive engineer by Norton Co., Worcester, Mass. So has **Robert P. Cooper.** Both men were field engineers in the Los Angeles district office; under the new setup, each will have his own part of the city.

Wesley C. L. Hemeon . . has resigned his post as engineering director of the Industrial Hygiene Foundation in order to head up his own firm, to be known as Hemeon Associates. The new company will be located in the Loeffler Building, 121 Meyran Avenue, Pittsburgh. One of the "associates" will be **George F. Haines Jr.,** as chief engineer. Hameon Associates will serve as general consultants of all phases of air pollution.

Henry E. Billiat Jr. . . is now technical sales service representative for Archer-Daniels-Midland Co. in the Kansas City area.

Otto A. Praff . . president of Wheelabrator Corp., Mishawaka, Ind., has been appointed to the University of Notre Dame College of Commerce advisory council.

E. E. Keen . . has been shifted to a new territory for C. R. Daniels, Inc. From his new headquarters in St. Louis, Mo., he will cover parts of Illinois, Indiana, Kentucky, Tennessee, Arkansas, and all of Missouri and Kansas.

Horace Bringhurst . . for 23 years in foundry coke sales with Semet-Solvay Div., Allied Chemical & Dye

Corp. has been named president and general manager of Superflux Mfg. Co. (formerly Weaver Block Co.).

Edward J. Henzerling . . has joined the C. R. Daniels, Inc., organization. He will cover Ohio, Kentucky, Tennesee, and parts of Indiana and West Virginia for the Daniels Belting Division.

Leslie V. Whiton . . has opened an office in White Plains, N. Y. for consultation on production and marketing of non-ferrous metals.

Roderick J. Cowles . . is now senior research engineer for the Walworth Co., South Boston, Mass. His previous connection was with Lebanon Steel Foundry.

Les Coleman . . has been transferred to the Chicago sales department of Flexible Steel Lacing Co., where he will assume new and increased responsibilities.

Thomas L. Ward . . has been named manager of the Alco Products' plant at Dunkirk, N. Y. He has been with the firm since 1937.

L. W. Eger . . is now manager of manufacturing services for Alco Products, Inc. He was previously their production manager of thermal products at Dunkirk, N. Y.

Al W. Roth . . is the new manager of the just-formed Large Propeller Div. of Aerovent Fan Co., Piqua, Ohio. Mr. Roth will continue to maintain offices at Tulsa, Okla., and the home office of Aerovent.

Al Gladding . . is now representing Flexible Steel Lacing Co. in the north-east states. The company manufactures belt fasteners and self-vulcanizing rubber repair materials.

F. W. Ecker Jr. . . has been put in charge of handling Baker-Raulang Co. products or the Mechanical Handling Co., Seattle, new distributors for the fork truck firm.

C. R. Welles . . has been promoted to sales manager, Hanna Furnace Corp., merchant pig iron division of National Steel Corp.

U. S. Reduction Co., East Chicago, Ind., has two new vice-presidents: **R. W. Tompkins**, sales, and **H. A. Eastbrook**, production.

Edward I. Orley . . former staff accountant for Bohn Aluminum & Brass

Corp., has been appointed budgets and measurements analyst for Carboloy Dept. of General Electric Co., Detroit.

L. S. Wilcoxson . . has been elected to the board of directors of Babcock & Wilcox Co., New York. A vice-president of the firm, Mr. Wilcoxson will continue to be in charge of their boiler division.

Dr. James I. Hoffman . . has been chosen to head the metallurgy division of the NBS. An outstanding analytical chemist, he succeeds **Dr. John G. Thompson** who recently retired.

Dr. G. V. Slottman . . vice-president, research and engineering of Air Reduction Co., Inc., was presented the Morehead Medal by the International Acetylene Assn. during their 56th annual convention in Los Angeles.

Hugh C. Riley . . has been named district representative for Erie Clamshell buckets. His territory includes western New York, western Pennsylvania, West Virginia, Kentucky, Ohio, Michigan, Indiana, northern Illinois, and Wisconsin.

Martin Victor . . has been elected secretary of The Babcock & Wilcox Co., New York. Mr. Victor has previously been executive assistant.

Gene Passman . . has taken charge of foundry facing sales for Frederic B. Stevens, Inc., Detroit.

Arthur L. Rakestraw . . Norton Co. field engineer in Chicago, has retired. He was a member of the Norton organization for 28 years.

R. A. Entringer . . has moved to the post of general manager for Alcaloy, Inc., at Trenton, N. J. Alcaloy is a non-ferrous, permanent mold foundry associated with Dickey Industries of Cleveland.

Robert G. Keller . . has been appointed chief engineer of the machine division of Lewis Welding & Engineering Corp., Cleveland.

Philip F. Erlandson . . has joined Acme Resin Corp., Forest Park, Ill., as sales manager.

John Kunysz . . has been named chief chemist for the Black Products Co.'s Fontana, Calif., facing material plant.

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pouring off the heat

does CO_2 process hurt sand?

■ In Talk of the Industry in the April issue of MODERN CASTINGS you wondered what influence sodium carbonate resulting from the CO_2 process might have on foundry sands. Here are some comments and data from experiments I ran.

Sodium carbonate residue in return sand after casting steel in cores bonded with 5 per cent of a proprietary CO_2 process binder is not in any way harmful when used for making a conventional oil sand core mix for blower use or for making a conventional facing sand for green sand machine molding.

Although the pH of both core and facing mixtures made of used sand were close to 10 (several units higher than mixtures made of new sand) no other significant variations, favorable or unfavorable, were noted. Used sand mixtures were compared with new sand from the same car; AFS grain fineness was 52.

Starting with new sand, 32 cores were made using 5 per cent of a proprietary sodium silicate mixture. Each core was impregnated in the box through a 4-in. vent open only on one end for 16 seconds with CO_2 gas released at 20 psi at the regulator. These cores were placed in molds which were then poured with Grade B steel.

Enough used core sand was recovered and kept separate from the molding sand to enable two mixes to be made. One was an oil sand mix which was used to make cores like those originally bonded with sodium silicate and CO_2. The other batch was a green sand facing. Both mixes were made up in the conventional manner with the only variable being the residue from the Na_2SiO_3 plus CO_2 reaction.

The test molds contained two castings weighing about 140 lb. each gated with a common sprue and runner. One pattern in each mold was faced with the reclaimed sand and the cavity was cored with a test core. The other half of the mold was faced with new sand facing and cored with production cores made from a mix used for thousands of this item. A number of molds were made up this way and each casting was appropriately marked.

After shakeout the castings showed no difference in internal or external

appearance, nor was there any difference after blasting. All castings were good and could not have been related to the core and mold mixtures if they had not been marked. No detrimental effects were observed.

Sand tests gave the following data for the mixtures:

	Core			Facing	
	New	Used	CO_2	New	Used
H_2O, %	3.6	3.8	.25	3.3	3.4
Perm	130	140	183	170	160
Flow, %	82	85	78	75	80
pH	6.9	9.8	---	7.1	9.9
Green Comp, psi	2.7	2.5	1.6	7.0	6.8
Baked Comp, psi	380	420	162		
Transv*	650	660	540		

* Load in pounds to break core used in mold, not transverse test of standard specimen.

Previous experiments and tests made in an attempt to determine benefits of pH control produced little ground for this factor's continued control in facing sands. A mild acid was added to one batch of sand. pH dropped to 5 and did not go lower on further addition of acid. Another batch was loaded with soda ash to give a maximum pH of 10.5.

Six molds were made, two from each of the special pH mixes and two from the regular shop mix with no pH control additions. All were poured from the same heat and arranged so that any slight variation in teeming temperature would not favor any casting. No one who inspected the castings before and after blasting could detect any differences in surface finish among the castings.

J. B. Brown
Buffalo, N.Y.

may and june outstanding too

■ I wish to compliment you on the treatment of the National Foundry Association's panel, *"The Role of the Foreman,"* which you ran in April under the title *"Management Looks at the Foreman."*

We in the Association feel that the encouragement and training of foremen is one of the most important jobs to be done in the industry, and we appreciate your assistance in publicizing our efforts toward that end.

Arthur G. Hall, *Works Manager*
Nordberg Mfg. Co., Milwaukee
Vice-President, NFA

■ Congratulations on a particularly good issue—April—of Modern Castings! A number of our students have commented on it.

The students are very much inter-

ested in the article by Unfried entitled *"A Complete Chemical Analysis in 45 Minutes."* How about several sets of tear sheets for use in our foundry chem lab.

D. S. EPPELSHEIMER, *Prof.*
Dept. of Metallurgical Eng.
Missouri School of Mines & Metallurgy

A 1-hr method for analyzing slag is coming up soon accord'ng to W. T. Unfried, chief chemist, Texas Electric Steel Casting Co., Houston, Texas, the author of "A Complete Chemical Analysis in 45 Minutes."—EDITOR.

■ I have seen the April issue of MODERN CASTINGS containing the article *"Management Looks at the Foreman"* and wish to congratulate you on a fine presentation of our panel discussion from which your article was conceived.

C. A. CAROLIN, *President*
R. B. Carolin Foundry & Machine Co.
Detroit

ain't no such shavings

■ Those shavings on the cover of the February issue! That I would like to see.

ALLEN S. KITTRELL, *Owner*
Leach Pattern Shop
Baltimore

So would we. Then we could get off the hook. After hearing from you we tried to recall seeing shavings like that in a pattern shop. We couldn't.

We thought maybe we could get away with the explanation that the material being turned was laminated plastic-impregnated mahogany, a new entry in the field of pattern materials. That falls down because the new material machines more like metal than wood although it comes off in the form of a powder rather than in chips.

One MODERN CASTINGS staffer suggested we claim it is a new type of pattern construction with circular laminations built up to give a continuous grain around the circumference.

Maybe it would be possible to turn large shavings using some unorthodox technique, we thought. So we spent a Sunday afternoon in the basement using some nice, stringy wood and operating the lathe at various speeds and trying all our chisels along with all possible combinations of cutting angle, feed, and attack on the grain. Scraping, of course, wouldn't work at all so we didn't try that.

Forced to retire in defeat, we'll ex-

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plain what really happened. The picture came to us obviously posed. The lathe was not turning and the operator was looking out of the corner of his eye at the camera instead of concentrating on the end of the chisel. We asked the artist to give the picture motion by obliterating the grain and the joints between the pattern segments. He went one better—he thought —and added some artistic unlathe-like shavings, considerably larger than those that had accumulated on the base of the tool rest.

This reaction to a MODERN CASTINGS cover is typical of the increased readership that has characterized the magazine since it went king size and changed its name. Reader reaction from cover to cover is five times what it was a year ago.—EDITOR.

forward step in noise

■ Your Bonus Section on noise in the foundry industry (March issue of MODERN CASTINGS) is most impressive. It looks like a long step toward getting this problem recognized and handled as a regular part of operating a well run foundry.

W. E. SHOEMAKER
Publicity Chairman
American Industrial Hygiene Association

What Shape to Come?

A full-color sound film depicting the casting and forging of tools and dies by the Allegheny Ludlum Steel Corp. has just been released under the title, *"The Shape of Thing."*

The movie includes forging techniques, special anvil die work, manufacture of composite die sections, and general and special foundry practices employed at the firm's Forging & Casting Plant.

This new picture is one of 20 now listed in booklet G-3, available on request from the company. The film, or any movie in the company's library, is available for showing to organized groups on request to the Advertising Department, 2020 Oliver Building, Pittsburgh 22, Pa.

AFS Chapters Elect

■ New slates of officers have been announced by three of the 45 industrial chapters of the American Foundrymen's Society. Chapters announcing elections are:

Metropolitan

Chairman: R. A. Colton, Federated Metals Div., American Smelting & Refining Co., Newark, N. J.

Vice-Chairman: H. Voit, Sterling Wheelbarrow Co., Hackensack, N. J.

Secretary: S. B. Donner, ARD Corp., New York.

Treasurer: W. H. Ruten, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Directors: W. T. Bourke, Brake Shoe & Castings Div., American Brake Shoe Co., Mahawh, N. J.; W. C. Russell, Springfield Facing Co., Harrison, N. J.; R. L. Conroy, Reaction Motors, Rockaway, N. J.; A. Blanche, Worthington Corp., Harrison, N. J.; D. Jones, N. J. Silica Sand Co., Millville, N. J.

W. C. Russell, 401 South 2nd St., Harrison, N. J., is the membership chairman.

Washington

Chairman: Harold R. Wolfer, Puget Sound Naval Shipyards, Bremerton, Wash.

Vice-Chairman: William K. Gibb, Atlas Foundry & Machine Co., Tacoma, Wash.

Secretary: Fred R. Young, E. A. Wilcox Co., Seattle.

Treasurer: John W. Uren, Fire Brick Supply Co., Seattle.

Program Chairman: Leon Morel, Morel Foundry Corp., Seattle.

Directors: Henry E. Martley, H. E. Hartley Co., Seattle; Quentin S. Tracy, Salmon Bay Foundry Co., Inc., Seattle; Frank H. Jefferson, Frank H. Jefferson Co., Inc., Seattle.

Central Michigan

Chairman: Gerald D. Strong, Battle Creek Foundry Co., Battle Creek, Mich.

Vice-Chairman: Robert D. Dodge, Archer-Daniels-Midland Co., Detroit.

Secretary-Treasurer: David Sherman, Engineering Castings Co., Inc., Marshall, Mich.

Directors: Gordon Brown, Homer Foundry, Coldwater, Mich.; Stephen Pasick, Brooks Foundry, Inc., Albion, Mich.; Robert Porter, U. S. Foundry Corp., Kalamazoo, Mich.

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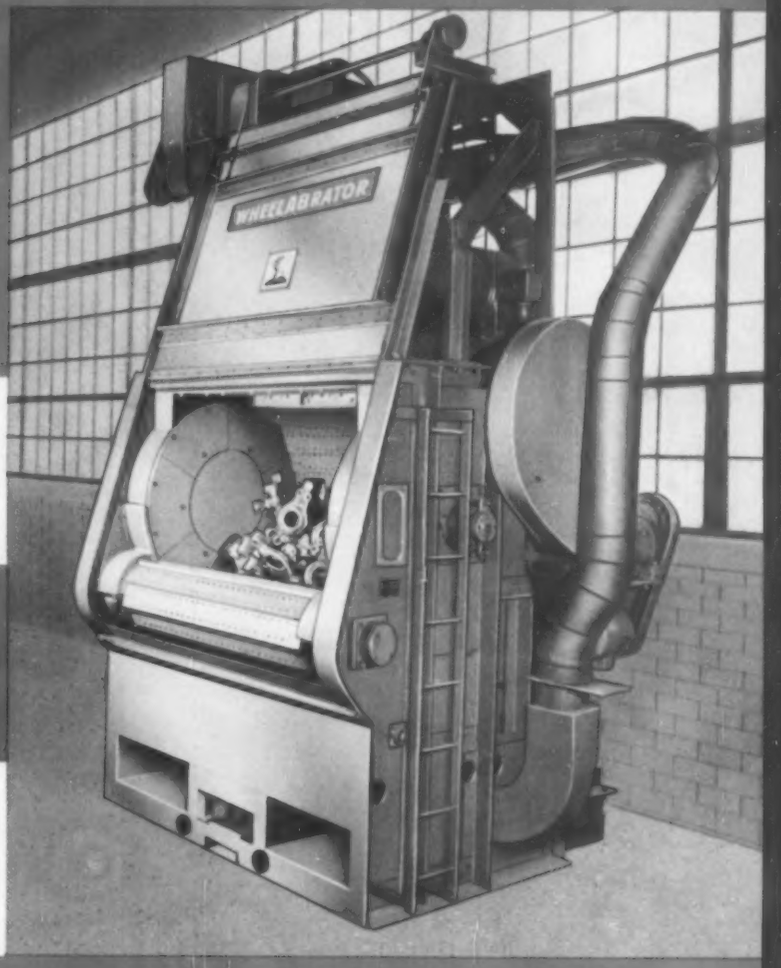
A BIG HIT
at the Foundry Show
A BIGGER HIT IN ACTUAL USE

WHEELABRATOR®

SUPER TUMBLAST

Proven SUPER SAVINGS IN OPERATING COSTS through Field Tests in Plants like these



At Unitcast Corp.

Operated over 6 weeks without wearing out a single part. Saves abrasive, cleaning time, man-hours.

At Dayton Malleable Iron Co.
(Ironton Division)

Provides quality cleaning with maintenance, abrasive and labor savings.

At Indiana Forge & Machine Co.

Cleans twice as much work in half the time . . . automatically.

See back page for additional details.

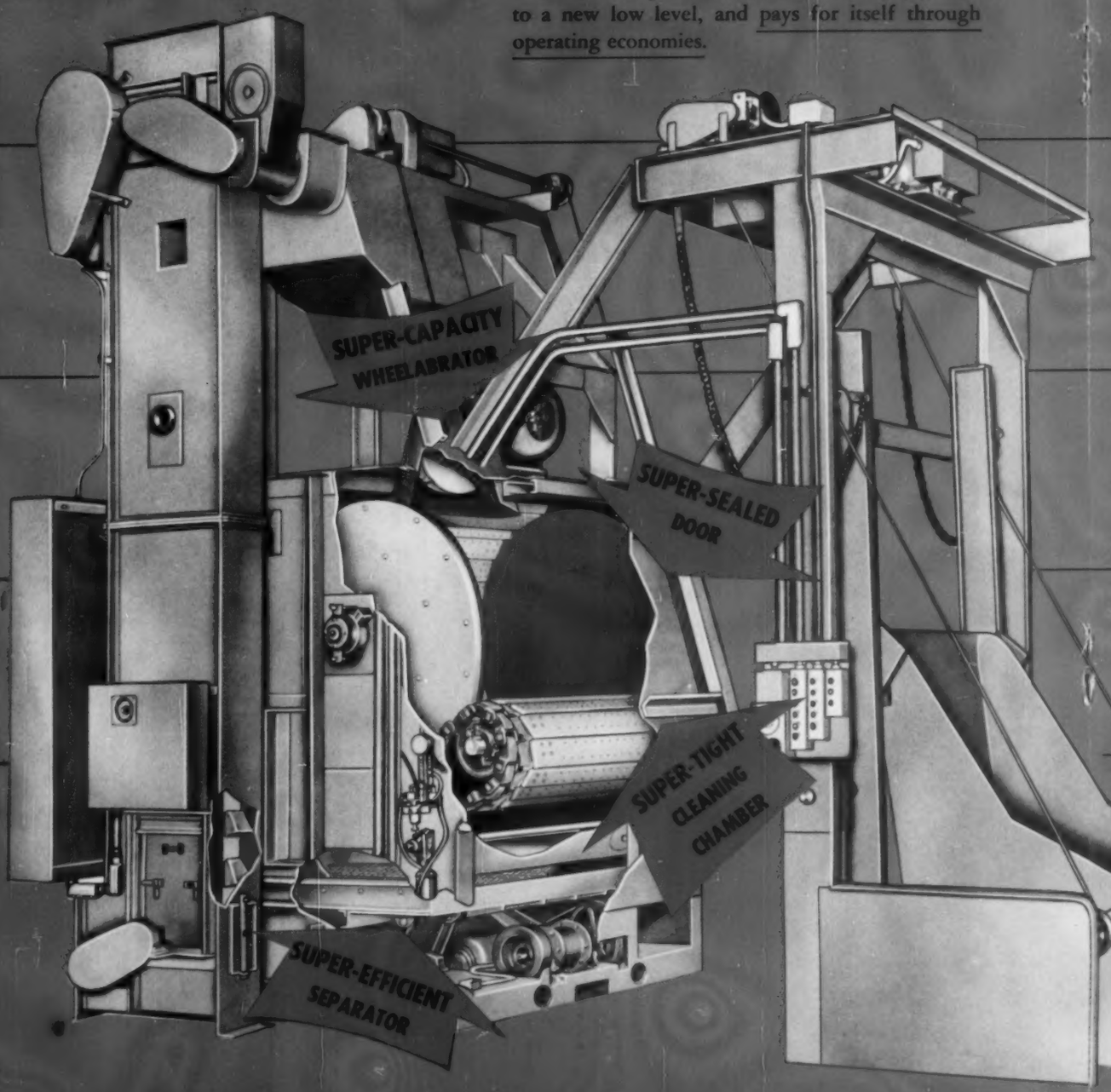
WHEELABRATOR
CORPORATION
505 S. Byrkit Street, Mishawaka, Indiana

WHEELABRATOR®

SUPER TUMBLAST

Pays for Itself Through Super-

The Super Tumblast is the modern day answer to high priced cleaning costs. It is specifically designed to give you more mileage out of your blast equipment and more profit out of your Cleaning Department. The Super Tumblast is engineered throughout for maximum productivity and maintenance-free operation over extended periods of time. Its trouble-free operation lends itself to automated operation but, whether automatic or manual, the Super Tumblast reduces cleaning costs to a new low level, and pays for itself through operating economies.



Savings in Operating Costs

New SUPER-CAPACITY Wheel throws more than twice the abrasive . . . is easier to service

The New Super-Capacity Wheel throws more than twice as much abrasive as any similar sized wheel previously used. Less power is required per pound of abrasive thrown. The blast pattern is spread over the entire blast chamber in a more uniform manner, providing faster, more uniform cleaning. The wheel has new Long-Lyfe Blades, a strain-free blade holding device, a new easy-service wheel guard housing, and a new system of Long-Lyfe wheel guard liners, all designed to reduce maintenance to a minimum.

New SUPER-EFFICIENT Separator saves wearables and abrasives

The New Super-Efficient Abrasive Separator is perhaps the greatest single cost-saving feature of the machine because it affects so many areas. It increases cleaning efficiency and speed by maintaining the optimum abrasive mixture throughout the blast cycle. It removes sand and scale in the heaviest concentration without removing abrasive particles until they are too small for use. By removing highly-abradant contaminants with so much greater efficiency the Super Separator eliminates a major cause of machine wear.

New SUPER-TIGHT Cleaning Chamber eliminates jamming of work

This is the tightest steel flight conveyor ever used in blast equipment. There are no open spaces where even the smallest work can get caught and damaged . . . and there are no areas where work can jam and displace liners, interfere with the operation of the door, or break the abrasive-tight seal on the machine. This reduces downtime to a minimum.

New SUPER-SEALED Door prevents abrasive loss

The New Super-Sealed Door keeps all abrasive in the machine and provides trouble-free operation on any type of work. The power-operated one-piece door will withstand impacts from both inside and outside the mill. It travels in tracks that are integral with the side frames of the machine. The abrasive seal formed by these tracks is as strong as the basic structure of the machine. The door is reinforced to prevent jamming or warping.

LONG-LYFE Parts throughout have 25 to 50 times longer life

Every high-wear point within the Super Tumblast is equipped with Wheelabrator Long-Lyfe Parts. These parts are made of a patented alloy steel fully heat treated for maximum possible wearable life. They last many times longer than ordinary parts to save hours in replacement time, machine downtime, ordering and handling time.

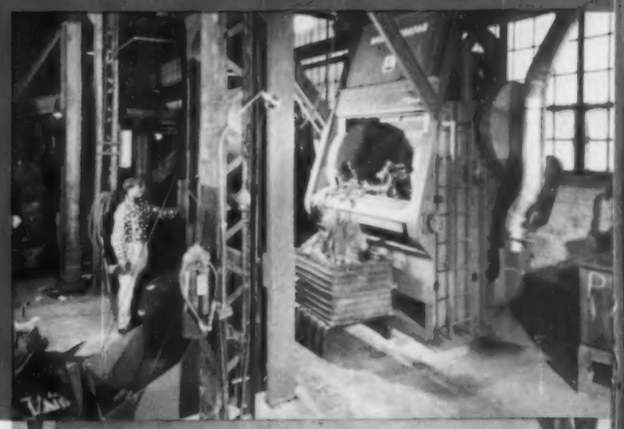
WHEELABRATOR
CORPORATION

These SUPER TUMBLAST installations Produce SUPER SAVINGS in Cleaning Costs Through Increased Productivity and Automation

At
UNITCAST CORP.
Toledo, Ohio

Saves
— In Maintenance
— In Abrasive Costs
— In Operating Costs
— In Cleaning Quality

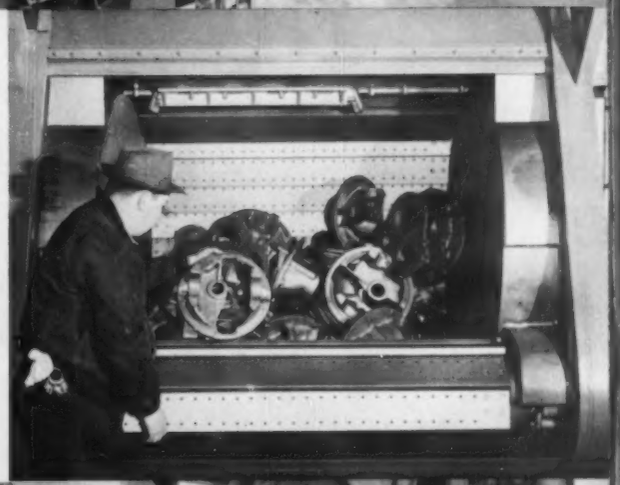
Cleans the toughest jobs as fast or faster than ever before . . . and does so more economically. In 6 weeks of regular operation not a single part was worn out. "It's the best cleaning machine of its size we have in operation in our plants," is the way the manager of foundries summarizes the overall savings effected by the Super Tumblast.



At
DAYTON MALLEABLE IRON CO.
(Ironton Division)

Overcomes Maintenance Headaches

Quality cleaning, low maintenance costs and reduced abrasive consumption are made possible by the efficient separator on the Super Tumblast. The maintenance foreman, summarizing the features of the machine, says, "This machine is designed for the maintenance man."



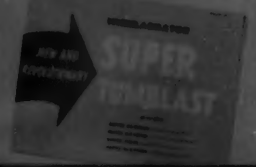
At
INDIANA FORGE & MACHINE CO.
East Chicago, Indiana

Automatic batch type cleaning becomes a reality

Doing the work of two smaller machines, the Super Tumblast cleans twice the work in half the time formerly required. The entire operation is controlled by an automatic timer which is put into action by the trucker by simply pushing a starting button after charging the loader. Substantial savings result in both labor and operating costs.

All Super Tumblasts operating with Wheelabrator Steel Shot for additional cost savings

New 12-page Brochure gives SUPER TUMBLAST details — write for copy today.



WHEELABRATOR
CORPORATION

503 S. Byrkit Street, Mishawaka, Indiana
World's Largest Manufacturer of Airless Blast Cleaning Equipment

talk of the industry

YIELD GOES UP 5% just through elimination of a large part of the riser extending below the parting line, Jim Lansing, technical and research director of the Malleable Founders' Society, reported at that organization's recent Market Development Conference. Further, by making one riser feed two castings, he said, one shop had increased yield from 44 to 66% on one casting, and from 64 to 80% on another.

THE MACHINE MIXED and extruded other types of material so Joe Johnson, foundry superintendent of Bonnot Co., figured that one of his company's products designed for the ceramics and refractories field ought to do all right in the foundry too. Now he's producing his own undried bricks for cupola patching and ladle lining. Machine as modified by Joe mixes and extrudes about 1 ton an hour of a continuous slab of refractory 6 in. wide and 2¼ in. thick. An automatic dispenser puts a sheet of paper under the slab to prevent sticking of the material (cut by hand to desired length) while piled in storage. Machine uses any mix desired including proprietary materials commonly used in monolithic lining and patching. Slabs become better during storage and they're usually prepared about a month's supply at a time but can be used immediately. Damp sacks on the stockpile keep them from drying out. Joe's cupola man prefers slabs about 12 to 14 in. long for a 48-in. cupola but the material can be used in any length that can be handled conveniently. Actual labor of applying and smoothing slabs is 40% less than application of refractory by the handful. No joint erosion, of course, because the lining becomes monolithic after smoothing.

SOME LIKE 'EM HOT, some like 'em cold. Shell molds, that is. There's no agreement on whether shell molds at pouring time should be warm or at room temperature. Some feel aging at shop temperature improves the shell, wouldn't pour them warm. Wonder what a refrigerated mold would do? Some prefer to pour molds while they're hot off the gluing press. One shop even reheats cold molds before pouring in case a production delay holds the shells up between joining and pouring. Who's right?

Herbert E. Jacobi

CIRCLE NO. 182, PAGE 21-22

CIRCLE NO. 183, PAGE 21-22

new books

Elevated-Temperature Properties of Carbon Steels . . Ward F. Simmons and Howard C. Cross. 68 p. ASTM Technical Publication No. 180. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. 1955. $3.75.

Compiled and issued under the auspices of the Data and Publications Panel of the ASTM-ASME Joint Committee on Effect of Temperature on the Properties of Metals, this report is the fourth in a series on the effect of temperature on the elevated temperature properties of metals. It includes data for tensile and yield strength, elongation and reduction of area, stresses for creep rates of 0.0001 and 0.00001 per cent per hour and rupture strengths for 100, 1000, 10,000, and 100,000 hours. Steel covered are killed carbon steel (0.18 to 0.24 C), ASTM A 201 Grade B plant steel (0.24 C max), ASTM A 106 Grade B pipe steel (0.30 C max), killed carbon steel (0.27 to 0.58 C), aluminum killed steel, open steel (rimmed or capped), and miscellaneous carbon steels (limited data available).

Development of Wrought and Cast Alloys for High Temperature Applications . . PB 111891 R. R. MacFarlane, R. S. DeFires, E. E. Reynolds, W. W. Dyrkacz. 93 p. Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. 1955. $2.50.

Report of studies conducted on wrought Fe-base, of the D-183 type, and both wrought and cast Co-base alloys, by Allegheny Ludlum Steel Corp. for Wright Air Development Center. Consists predominately of tables and graphs showing results of various tests.

Directory American Council of Independent Laboratories, Inc. . . (6th ed) Free on request to Dr. Harold M. Dudley, Executive Secretary 4302 East-West Highway, Washington 14, D. C.

Lists the 67 laboratories that are members of the Council, and gives details regarding their services, staffs, etc.

ASME Handbook – Engineering Tables . . Jesse Huckert (ed.) 704 p. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. 1956. $12.

This book, sponsored by the Metals Engineering Handbook Board of the American Society of Mechanical Engineers, is one of the four volumes comprising the **ASME Handbook.** (Other volumes are *Metals Properties, Metals Engineering – Design,* and *Metals Engineering – Processes.*) It is arranged in 15 sections, grouping together tables which apply to the design of specific parts. These sections are: Bar Stock and Shafting – Conversion Factors – Formulas for Stress and Strain – Properties of Sections and Cylinders; Bearings – Bearing Load Analysis; Spur Gears; Helical and Herringbone Gears; Bevel Gears; Worm Gears; Cylindrical Fits – Standard Tapers; Keys and Keyseating; Bolts – Counterbores – Screw Threads – Slots – Broached, Drilled, Reamed and Tapped Holes; Serrations and Splines; Nuts – Pins – Snaprings – Washers – Wrench Openings; Springs; Aircraft and Mechanical Tubing – Pressure Tubes – Pipe – Pipe Threads and Fittings; Electric Motors – Graphical Symbols – Welding; Gaskets – Hydraulic Standards and Symbols – O-Rings – Packings – Seals.

Theory and Practice of Lubrication for Engineers . . Dudley D. Fuller xiii + 432 p. John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, 1956. $10.50.

The over-all purpose of this book, as stated by the author, is to guide the engineer in his study of the theory of lubrication so as to most effectively implement him in his practice of lubrication. The chapters are as follows: Fundamentals of Viscosity and Flow; Viscosity and its Variables; Hydrostatic Lubrication; Hydrostatic Squeeze Films; Hydrodynamic Lubrication; Hydrodynamic Lubrication of Journal Bearings; Friction and Power Losses in Journal Bearings; Some Typical Industrial Bearings; Air-Lubricated Bearings; Dry Friction; Boundary Friction; and Bearing Materials. An exceptionally thorough index, 261 references to literature, 234 figures and 64 tables greatly add to the value of this work.

Supervisors Safety Manual . . National Safety Council. v + 354 p. National Safety Council, 425 North Michigan Avenue, Chicago 11, 1956. $3.25 to members, $6.50 to non-members.

Twelve chapters discuss: Safety and the Foreman; Know Your Accident Problems; the Human Element; Maintaining Interest in Safety; Instructing for Safety; Health and First Aid; Personal Protective Equipment; Departmental Housekeeping, Materials Handling and Storage; Guarding Machines and Equipment; Hand Portable Power Tools; and Fire Prevention Control. The book is designed to "promote hazard-free operations and to arouse safety consciousness in the individual worker through the supervisor."

High Temperature Technology . . I. E. Campbell (ed.-in-chief) xiv + 526 p. (Sponsored by the Electrochemical Society, Inc.) John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, 1956. $15.

In recent years metals engineers, metallurgists, ceramists, and chemists have engaged in extensive research in an effort to develop new materials of construction for service at very high temperatures. This book, comprised of three sections: Materials; Methods; and Measurements; offers in succinct form the highlights of their research achievements to date. Thirty-five outstanding workers in the field describe new materials, cover methods used in production, and explain techniques for measuring properties. In general, consideration is given primarily

to service at temperatures above 1500 C. However, since much of the processing of materials for service at these temperatures is done at considerably lower temperatures, much of the discussion, particularly in the Materials and Methods Section, relates to processing at moderate temperatures.

ASTM Standards – 1955. . . Pts. 3, 4, 5, 6, and 7. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.

Pt. 3 – Cement, concrete, ceramics, thermal insulation, road materials, waterproofing, and soils. Non-metallic materials widely used in construction are covered in this Part which contains 2062 pages with 477 standards; 231 standards are new or have been revised since 1952. $13.50.

Pt. 4 – Paint, Naval Stores, Wood Cellulose, Wax Polishes, Sandwich and Building Constructions. 1416 pages with 323 standards, of which 129 are new or have been revised since the 1952 edition. $11.

Pt. 5 – Fuels, Petroleum, Aromatic Hydrocarbons, and Engine Antifreezes. Contains 1496 pages with 242 standards, 117 of which are new or revised since 1952. $11.

Pt. 6 – Electrical Insulation, Electronic Materials, Plastics and Rubber. 1776 pages with 300 standards, 148 of which are new or revised since 1952. $13.

Pt. 7 – Textiles, Soap, Water, Paper, Adhesives, and Shipping Containers. 1692 pages, with 354 standards, 166 of which are new or revised since 1952. $11.

Modern Manufacturing Processes . . Joe L. Morris. ix + 533 p. Prentice-Hall, 70 Fifth Ave. New York 11, N.Y. 1955, $9.35.

Present manufacturing processes organized in logical sequence and explained at a fundamental level. For more advanced readers, references and review questions are given for each chapter. Drawings, photographs and tables.

Steel Foundry Practice . . John Howe Hall. viii + 496 pp. Penton Publishing Company, Penton Building, Cleveland 13, Ohio. 1955. $12.

Complete treatise on steel foundry practice. Includes chapters on core and molding sands, patterns and molding methods, gates and heads, machine molding, flasks and rigging, centrifugal casting, shakeout, cleaning and welding, heat treatment, cast-weld construction, open-hearth steelmaking, electric melting furnaces, converter process and pouring practice. Diagrams, photographs, and graphs.

How to Find a Buyer for Your Invention . . V. D. Angerman. 186 p. Science and Mechanics Publishing Company, 450 East Ohio Street, Chicago 11, Illinois. 1956. $2.95.

Tells when, how and where to sell an invention. After warning the would-be inventor to be sure that his product is economically feasible to produce and market, this book lists hundreds of items

needed by top manufacturers and gives the name and title of the man to contact in various firms. 140 firms and the inventions they would like to have are listed. Four cross-indexed lists tell what the inventor needs to know to locate the best prospects and make the most money. Many other suggestions include information on how to protect the invention, how to find out if it is patentable, and how to interest a prospective buyer. If you are a manufacturer who would like to be listed, without charge, as a prospective buyer of inventions, get in touch with the publisher of this book.

Constitution of Titanium Alloy Systems, PB111508, 261 p. Feb. 1953, $8, and Supplement, PB111508S, 155 p., Sept. 1954, $4. Armour Research Foundation for Wright Air Development Center. Obtain from U. S. Department of Commerce, Office of Technical Services, Washington 25, D.C.

Phase diagrams of titanium alloys on all information available through published literature or unclassified government reports as of Sept 1954. References.

Government-Industry Cooperation in Standardization . . 96 p. American Standards Association. 70 East Forty-Fifth St., New York 17. 1955. $3.

Thirty addresses by government and industrial leaders and military officials at the Sixth National Conference on Standards. Sponsored by the American Standards Association and the National Bureau of Standards, the meeting was the first of its kind ever held jointly by industry and a government agency.

Design of Heating and Ventilating Systems . . F. W. Hutchinson. xi + 308 pp. Industrial Press, New York 13. 1955. $7.

Ninety-six working charts accompanied by explanatory text and examples to aid in solving complex formulae in the mathematical areas of design. Intended to supplement the standard texts in the field, the book gives more attention to panel heating, solar heating, and airway design than to radiators, convectors, or gravity-circulation warm air systems.

Investment Castings for Engineers . . Rawson L. Wood and Davidlee Von Ludwig. x + 477 p. Reinhold Publishing Company, 430 Park Avenue, New York. 1952. $10.

A comprehensive description of features, advantages and limitations of investment casting processes in commercial use. Recent techniques are described in detail. Two chapters deal with the frozen mercury method. Tabulation of high temperature and corrosion resistant alloys of steel, nickel and cobalt are offered. Numerous photographs and a comprehensive bibliography are included.

Foundry Practices . . S. E. Rusinoff. vii + 261 pp. American Technical Society, 848 E. 58th St., Chicago 37, Ill. 1955. $6.50.

Aimed at students in survey courses and individuals interested in a superficial background in metal casting, the book

hits most of the high spots but gives little detail for the reader seriously interested in castings production. Has a limited bibliography at end of book. Review questions follow each chapter as an aid to home study.

The book has a number of shortcomings which interfere with full study of any particular phase of castings production. Pearlitic malleable and nodular iron are not mentioned, nor is space given to casting design, quality control, or vacuum melting. Counter gravity casting, which is not a commercial process is given three pages while shell molding receives hardly more than a page. It is regrettable that in the brief discussion of shell molding the impression is given that it is a patented process (anyone may use it, although certain specific pieces of equipment are patented) and that a specific manufacturer's resin is required. (Most synthetic resin producers have one or more suitable resins).

Accident Prevention Manual for Industrial Operations (3d ed) . . 1341 p. National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. 1955, $13.50.

This edition contains 43 sections, 17 of which are new and the others extensively revised. Information to organize and keep a safety program going. Chapters on accident records and injury rates, accident investigation and costs and workmen's compensation insurance. Technical information on pressure vessels, handling materials, conveyors, machine tools, welding, portable power tools, electrical hazards, flammable liquids, etc.

NANCY PURUCKER, *Librarian*
American Foundrymen's Society

Don't Listen to Lorelei

A lively discourse on politics involved in international tariff problems has been published by the American Tariff League, Inc., under the title, "Willoughby & The Lorelei."

Hero of the story is Willoughby Lowdermilk of the Lowdermilk Manufacturing Company, Lowderville, Michigan, the nations' oldest and largest producer of fuel spouters. In this tale, Will and his old man, Rufus, run afoul of the General Agreement on Tariffs and Trade (GATT) and its administrative body, OTC – Organization for Trade Cooperation.

For the American Tariff League's view of these organizations, as seen through the eyes of a fictional Michigander, write: Richard H. Anthony, American Tariff League, Inc., 19 W. 44th St., New York 36, N. Y.

Abrasive Wheel Deal

■ For the first time, information on maximum operating speeds for mounted abrasive wheels has been compiled in a 36-page booklet issued by the Grinding Wheel Institute, Cleveland. Prior to publication of "Mounted Wheels", operators were forced to compute maximum speeds by using "critical speed" information. The eight easy-to-use top speed tables in the booklet are designed to facilitate correct application, eliminating the confusion which existed when speeds other than safe maximum operating were listed.

The booklet contains rules for safe and efficient operation on standard sizes of mounted wheels together with standard mandrel sizes for each. There are also three pages of silhouette drawings of popular standard sizes of mounted wheels. A new suffix designation system simplifies ordering mounted wheels in standard sizes.

AFS Forms Radiation Group

Radiation safety now has a committee of its own. This group, associated with the American Foundrymen's Society, will act in an advisory capacity on matters concerning radiation or radioactivity. It's called the Radiation Protection Committee. One of its big jobs will be to develop and spread technical information leading ultimately to a manual on radiation safety.

Present members include chairman Joseph O'Brien, Nuclear Physics Dept., IIT; Leonard Cole, Crane Co.; Floyd Sutherland, Continental Foundry & Machine Co.; Francis Gavigan, AEC; B. A. Hindmarch, American Steel Foundries; H. J. Weber, AFS staff; Floyd Van Atta, National Safety Council; and R. F. Holste, General Electric Co.

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of all **MODERN CASTINGS** articles are available on request. Keep your magazine intact and pass it on for others to use. For free tear sheets, write to Editor, **MODERN CASTINGS**, Golf & Wolf Roads, Des Plaines, Ill. Please show company connection and your title on tear sheet request.

Explore Causes of Sub-surface Blowholes

■ Small sub-surface blow-holes in gray iron castings have often posed a difficult problem in foundries. They are usually spherical, with smooth, generally dull surfaces. They often contain a slag-like material and generally do not show up until the surface metal has been removed by machining. They are usually found in clusters beneath the top surface of a casting, as poured. They may show up sporadically and disappear without apparent change in standard conditions.

W. G. Tonks, of the development department of the British Cast Iron Research Association in Birmingham, England, reported results of research into the problem at a Gray Iron session of the 60th AFS Casting Congress.

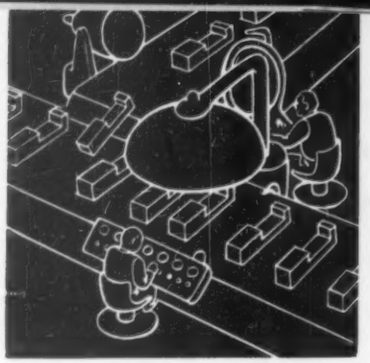
The common feature of the defects studied by Tonks and his associates was manganese sulphide segregation. They conducted a series of experiments to study the influence of variations of manganese and sulphur contents, together with the effect of pouring temperature on the incidence of sub-surface blowholes.

In their experiments they were able to reproduce the blowholes which had been found in defective castings taken from different foundries. The manganese sulphide segregation and the inclusion of a slag-like material were present in the defective areas of both test castings and those brought in from outside for study.

The researchers discovered that for a given manganese and sulphur content, the incidence of sub-surface blowholes increases as the pouring temperature falls. The experimental work indicates that low temperatures is the primary factor in promoting such defects.

At a given pouring temperature, the product, manganese content of the metal x the sulphur content of the metal, has a critical value which, when exceeded, promotes the occurrence of sub-surface blowholes.

As far as foundrymen are concerned, it appears easier to control the pouring temperature and possibly the manganese content than the sulphur content.



60th AFS Castings Congress and Exhibit News Story

Technical sessions and vast display of equipment and material draw crowd of over 13,000 foundrymen to Atlantic City

■ Means for producing better castings with more efficient use of men and materials were examined and studied on the exhibit floor and in technical sessions by over 13,000 people who attended the 60th Annual Castings Congress and Show of the American Foundrymen's Society at Atlantic City, N. J., May 3-9. During these seven days, those charged with the operation of the foundry of today and with planning for the foundry of tomorrow attended the great display and the technical programs, all under the leadership of the society's president, Bruce L. Simpson.

In more than 100 technical papers and in 239 exhibits covering over 94,000 sq ft the metal casting industry demonstrated its accelerated development. From abrasives to zircon sand, the papers and displays demonstrated the impact of the carbon dioxide process, shell molding, and automatic control for machinery on the men who mold and pour castings. The words "epoxy resin" seemed foremost in every patternmaker's mind, while casting producer and casting buyer investigated the use and application of new inspection instruments including the radiographic inspection equipment.

The foundry of tomorrow was forecast in the technical sessions which alerted the industry to current developments including both those immediately applicable and those resulting from the exploration of basic problems. For the first time, the technical program included a group of "fundamental papers." These were intended to be of a very basic and technical nature, but the crowd that heard the papers may have determined that the "high-brow" material of today will become operating data tomorrow when informed that some of the new concepts disclosed in the papers are already being utilized to cast difficult shapes in uranium and plutonium.

Technical activities at the Congress were centered in the Atlantic City Convention Hall, the world's largest, while breakfast, luncheon and evening sessions were held in hotels on the famed Boardwalk.

President Bruce L. Simpson presided at the annual business meeting which was held as a luncheon for the first time. President Simpson declined to make a speech but remarked briefly on the success of the society during a year marked by the addition of three industrial chapters and the growth of total membership to over 12,400.

Results of deliberations by the AFS national nominating committee were reviewed at the luncheon meeting and affirmative ballots were cast for the nominees. Frank W. Shipley was elected president, Harry W. Dietert was named vice-president, and the following were elected to the society's board of directors: Roger W. Griswold, Herbert Heaton, A. V. Martens, Garnet P. Phillips, Alex W. Pirrie, R. V. Righter, and Gerald R. Rusk. Complete details of the elections appear on page 45.

During the luncheon the five first-place winners in the Robert E. Kennedy Apprentice Contest were introduced. Turn to page 86 for individual pictures of all 15 winners and their entries.

Following the completion of all business, President Simpson introduced S. C. Massari, National Engineering Co., who presented the annual Charles Edgar Hoyt Memorial Lecture on the subject "Marketing Your Product."

Massari told the audience that "every foundry should have some form of marketing program. The basic principles have been outlined and the extent of such a program can be tailored to suit the needs of every foundry regardless of size."

The most important facet of such a marketing program, he said, is to "know your product; explore and energetically sell it based upon its merits; understand its deficiencies and don't mis-apply them, for to do so hurts the future of your business as well as all other foundries."

Most formal of the convention affairs was the AFS Annual Dinner. Attended by the largest crowd ever present at an AFS banquet, the dinner featured the presentation of AFS Honorary Life Memberships and Gold Medal Awards.

Winners of gold medals were Charles C. Sigerfoos, James S. Vanick, and Harold F. Bishop. Honorary Life Memberships were presented to Joseph C. Pendleton, William D. McMillan, and to the retiring president, Bruce L. Simpson.

The number of people who wanted to attend the banquet exceeded the available seats in the dining room, so the banquet speech was piped into another parlor of the hotel where several hundred additional people heard the speaker, Dr. Norman Vincent Peale, pastor of Marble Collegiate Church, New York, present his philosophy in the form of an address, "Efficiency Through Right Thinking."

F. W. Shipley: new president picks up reins at convention.

Saturday, May 4, was Atlantic Coast Day during which employees of plants in the vicinity of Atlantic City were invited to visit the exhibits without charge. A crowd estimated to exceed 2,000 took advantage of the offer of free admittance.

On display at the AFS publications booth during the convention were three rolls for distinguished visitors to the Castings Congress: the International Guest Register,

the Canadian Guest Register, and the Honor Roll for foundrymen with more than 25 years of service in the industry. The old-timers who took advantage of the opportunity to register totaled 96, with the oldest signing in at 83, and the longest period of activity being 57 years. The International register showed entries from 11 nations, exclusive of Canada. Foreign conventioneers included Noel Newman, past president of the Institute of British Foundrymen and their official delegate, and Miguel Siegel, official delegate from Brazilian Institute of Metals.

The Canadian members of AFS held the traditional Canadian Dinner which was attended by the large number of Canadians at the Congress. G. E. Tait, AFS director from Canada, was the toastmaster for the affair and he introduced Vice-President Shipley, Past President Dost, and Alex W. Pirre and Herbert Heaton, two new AFS directors from Canada.

H. W. Dietert: now national vice-president of the society.

B. L. Simpson: led the society through record convention year.

As usual, all ladies attending the Congress were invited to be the guests of the society at the official AFS Tea. Mrs. B. L. Simpson and Mrs. F. W. Shipley presided at the tea table and President Simpson and General Manager Wm. W. Maloney welcomed the guests on behalf of the society. Other features of the separate program which had been planned for the ladies included a art gallery tour and lecture, a visit to a famous orchid nursery, a fashion show, a lecture on flower arranging, and a program entitled "Musical Mishaps."

While the ladies were being entertained, their men were viewing the vast exhibit of equipment at the Convention Hall or attending one of the many technical sessions to hear papers describing current research and advancements in techniques. A summary of the technical activity at the Congress follows.

Air Pollution

■ Interest in air pollution control appeared heightened by the interest shown by various government agencies in legislative control over this industrial problem.

Available Control Equipment for the Foundry Cupola, John M. Kane, American Air Filter Co., Inc., Louisville, Ky. With the increasing publicity and legislation directed at air pollution throughout the United States, "some degree of solids removal from cupola gasses will be indicated in the foreseeable future for many localities," according to Kane.

Control of Make-Up Air in Industrial Plants, K. E. Robinson, General Motors Corp., Detroit. Through the use of a slide demonstration, Robinson illustrated improper heating methods in common use in foundries. He presented case histories showing where the heat output of a heating plant was greatly reduced while the comfort of workers was increased through better heat distribution and the elimination of drafts.

People—the Other Side of the Air Pollution Problem, E. M. Adams, Dow Chemical Co., Midland, Mich. There is no air pollution problem until someone complains about a condition, said Dr. Adams, so it is important for industry to study the attitudes of the people so that industry can cultivate favorable attitudes. He recommends that industry give close attention to any complaints and make an effort to treat the people as well as the emission. Unless this is done, the installation of equipment to control pollution "may fail to accomplish its purpose—that is, the reduction of an emission to acceptable levels." (Preprint 56-142)

Brass and Bronze

■ Gas in the metal, radiographic inspection and the new molding methods held the center of the

President Simpson led the way in pre-opening inspection of exhibits.

Signs detail steps in procedure that sped registration of over 13,000.

The President's lady pours a cup for Mr. Simpson at the Ladies Tea.

AFS ladies for whom Mrs. Simpson poured tea included: Mmes. F. J. Dost, Jake Dee, L. H. Durdin, A. H. Renfrow, L. P. Robinson, O. J. Myers, W. E. Sicha, W. E. Gude, Harold Johnson, E. C. Hoenicke and Miss Pamela Simpson.

AFS Directors at lunch. First row, left to right; R. W. Trimble, C. E. Nelson, H. C. Erskine, G. B. Emmett, C. W. Gilchrist, O. Jay Myers, Thomas Kaveny, Jr. Second row: F. W. Shipley, B. L. Simpson, F. J. Dost, E. C. Hoenicke, H. W. Dietert, L. H. Durdin, R. V. Righter, W. M. Hamilton, C. R. Rusk, A. V. Martens, W. W. Maloney, C. C. Drake, Herbert Heaton, W. A. Morley, R. W. Griswold, C. V. Nass, C. E. Brust, H. L. Ullrich, G. E. Tait, F. C. Cech, A. W. Pirrie.

Hoyt lecturer S. C. Massari accepts a .270 cal. Maunlicker-Schoenauer Manser rifle from R. F. Thompson as an honorarium for giving the lecture.

floor for the sessions on copper-base alloys.

Fluxing and Deoxidation Treatment for Copper, M. G. Neu, Foundry Services (Overseas) Ltd., Birmingham, England, and J. E. Gotheridge, Foundry Services, Inc., Columbus, Ohio. The development of a practical test for the visual estimation of the gas content of high purity copper melts was described by Neu and Gotheridge along with a discussion of the use of the test in a series of experiments to determine the efficiency of the principal types of fluxing media.

Gas Porosity in Oxygen-Free Copper Castings, D. V. Ragone, University of Michigan, J. K. Sprinkle, Virginia Polytechnic Institute, H. F. Taylor and C. M. Adams, Massachusetts Institute of Technology, Cambridge. This report of an investigation into the causes of gas porosity in copper and copper-base alloy castings dealt with the gaseous compound type of porosity in copper castings poured from oxygen-free melts.

Age-Hardening Characteristics of a Cast Alloy of Copper—5.8 Per Cent Titanium. N. Hehner, H. McCurdy, and R. Edelman, Frankfort Arsenal, Philadelphia. Copper-titanium is an old alloy, but the authors of this paper found that previous workers stopped their study when they found themselves unable to obtain sufficient strength. The maximum solid solubility of titanium in copper is 6.0 per cent at about 1625 F. At room temperature the total amount of titanium held in solution by copper is less than 0.5 per cent. The optimum mechanical properties for a cast copper-5.8 per cent titanium alloy were obtained after solution treating at 1625 F, water quenching, and age-hardening at 800 F. (Preprint 56-3).

Application of Radiography in the Manufacture of Bronze Castings. N. A. Kahn, Solomon Goldspiel, and R. R. Waltien. Use of radiography in the brass and bronze industry is placed at the same stage of development it had reached in the steel industry in 1938. The authors remarked that one radiograph is worth many cross sections and point to progress being made by the Navy Department toward radiographic inspection standards for brass and bronze castings as evidence of growing importance of this inspection technique. (Preprint 56-1).

New Horizons in Copper-Base Alloy Founding. The Brass & Bronze Round Table Luncheon discussion centered around several questions selected by luncheon attendants from a list provided by the Round Table Committee. Special molding methods, particularly the sodium silicate-carbon dioxide process and shell molding highlighted floor discussion.

CO_2 molds all but eliminate gag-

gers in propellor work, and have a chilling action similar to dry sand, it was brought out. There is less veining in tin bronzes with CO_2 cores and molds but a zircon wash may be required to avoid penetration. Pattern draw difficulties can be overcome by rubbing the pattern with graphite and rapping carefully before gassing. CO_2-faced green sand molds have stood five or six days without detrimental effects, it was reported.

It seemed to be the concensus that shell molding is a good foundry technique to be used whenever it is a better, cheaper way to produce a specific casting, but that it is not a universal substitute for other molding methods.

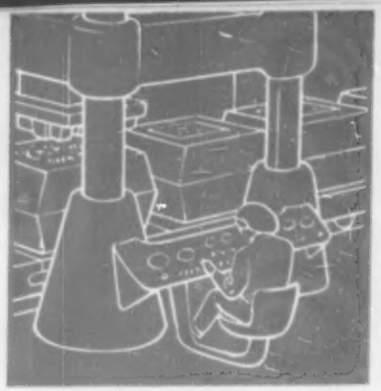
Speaking as chairman of the AFS Brass & Bronze Research Committee, F. L. Riddell, H. Kramer & Co., Chicago, reported that the committee was starting a study of feeding range in 85-5-5-5 at the University of Michigan.

Casting Defects Clinic, R. A. Colton, Federated Metals Div., American Smelting & Refining Co., Newark, N. J., F. L. Riddell, H. Kramer & Co., Chicago, and George F. Watson, American Brake Shoe Co., Mahwah, N. J. Fundamentals of foundry practice necessary for recognition, diagnosis, and treatment of copper-base alloy defects were covered with Mr. Colton speaking on melting, pouring, and solidification, Mr. Riddell speaking on gating and risering, and Mr. Watson speaking on mold and core materials. The speakers emphasized the importance of identifying defects correctly and changing the fewest possible factors so it is possible to tell which factor caused and eliminated the trouble.

Education

■ Challenges were hurled to industry leaders and to AFS chapters to produce programs capable of supplying the trained personnel required to assure the continuing development of the industry.

Tomorrow's Foundryman, L. F. Fletcher, Caterpillar Tractor Co., Peoria, Ill. Fletcher told the Education Division Round Table Luncheon that he believes that "Tomorrow's foundryman will be highly skilled in handling both metals and men." He also pointed out that "to help hold and improve our unique and distinctive way of life tomorrow's foundryman will implant in his employees and associates the desire and the willingness to be-



Three Frenchmen: Jean Diochon, Jean Charmeau, and Rene Baumes focus on charming Mrs. Behrent.

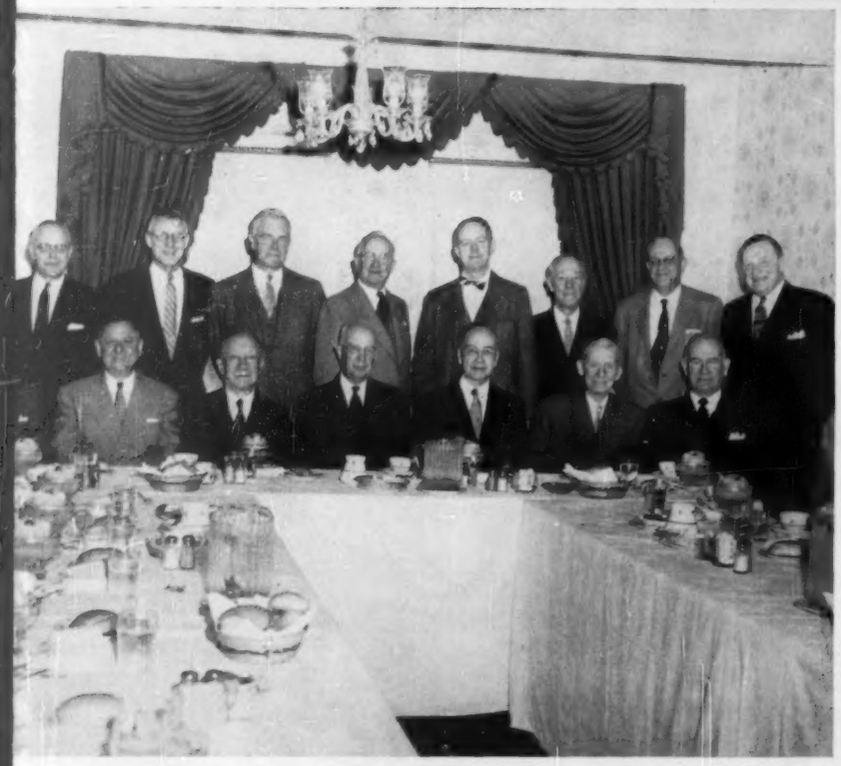
Jest by Fundamental Papers chairman Taylor amused vice-chairman Snyder and the onlooking authors.

Sand Division dinner found numerous and assorted dignitaries dining.

Refractories session chairman W. R. Jaeschke at lecturn instructs author A. P. Alexander, vice-chairman J. P. Holt, and authors Edward Boywid and L. R. Jenkins before beginning the session.

Light Metals session was whipped into shape by the chairman, B. L. Meredith, center. Author J. P. Krishon and vice-chairman John South are at the right and co-authors D. L. Colwell and Oldrich Tichy seated left.

Helpful assistance and information was offered visitors to 60th annual Castings Congress at the centrally located MODERN CASTINGS booth.



Past presidents' luncheon was largest gathering of past AFS leaders ever held. Present were: seated, Hyman Bornstein, L. N. Shannon, G. H. Clamer, W. R. Bean, R. J. Teetor, H. S. Simpson, and Marshall Post. Standing are W. W. B. Wallis, F. J. Walls, F. J. Dost, E. W. Horlebein, James L. Wick, Jr., Duncan P. Forbes, Lee C. Wilson, Walter L. Seelbach, and Collins L. Carter. During the luncheon, plaques were awarded to the past presidents. Below, W. R. Bean receives his award from F. J. Dost, the immediate past president.

come an effective part of the political life of his or her community."

Training Needs for the Foundry Industry, John S. McCauley, U. S. Dept. of Labor, Washington, D. C. A sharp increase in the need for patternmakers and maintenance mechanics by 1960 was forecast in McCauley's report. He stated that, "The introduction of new machines will increase sharply the need for patternmakers and electrical and mechanical maintenance men." The data was drawn from a recently completed study of a group of highly mechanized metal casting plants.

Chapter Educational Activities, H. E. Gravlin, Claude B. Schneible Co., Detroit. The metal castings industry is demanding trained personnel, a demand which AFS chapters can help answer, but the chapters must be prepared to plan, produce, and follow-up on any educational program that they initiate, according to Gravlin.

Responsibilities of Chapter Educational Chairmen, Panel members for this how-to-do-it session were as follows: Robert Herrmann, Penton Publishing Co., Cleveland; J. A. Barrett, National Malleable & Steel Castings Co., Indianapolis; R. W. Schoreder, University of Illinois, Navy Pier Branch, Chicago; and Morris McQuiggan, LaSalle Coke Co., Montreal, Que.

Fundamental Papers

▪ Presented for the first time at the 60th Castings Congress, the Fundamental Papers session is intended for the presentation of research work deemed of too technical a nature for inclusion in other sessions. A crowd of 175 persons attended the session. A clue to the interest in these papers may have been given by Chairman Taylor who stated that some of the concepts presented in the papers had been used in casting uranium and plutonium into difficult shapes.

Metal Solidification in a Flowing Stream, M. C. Flemings and C. M. Adams, Massachusetts Institute of Technology, Cambridge, Mass.; E. E. Hucke, University of Michigan, Ann Arbor. Dr. Flemings presented this discussion of the method and speed of pouring metal as a variable affecting the solidification of the liquid metal while the casting is freezing. In the experiments described, columnar grain growth was observed to point in the direction of the pour with the large end of the grain oriented toward the pour.

A New Method for Determining the Effect of Solidification Range of Fluidity, D. V. Ragone, University of Michigan; C. M. Adams and H. F. Taylor, Massachusetts Institute of Technology, Cambridge. This test uses a glass tube in place of the classical spiral used to study fluidity. Following studies made using the test, Ragone states that three conclusions were reached: fluidity varies inversely as solidification range; time required for the metal stream to stop moving varies inversely as the solidification range; and with alloys having a wide solidification range, the major portion of the fluidity is due to superheat above the liquidus. The authors of the paper state that their test has many advantages over the standard test.

A Quantitative Evaluation of the Susceptibility of Various Alloys to Shrinkage Defects, Richard A. Flinn, Jr., University of Michigan. The studies conducted and described by Professor Flinn indicate that shrinks may result from interference to flow resulting from the formation of crystals at the centerline of the castings. He states that the problem of producing a sound casting becomes one of determining the correct thermal gradient to control the centerline resistance. According to Flinn, these observations had their practical application in proving that a big riser won't always make a sound casting.

An Analysis of the Feeding Range for Long Bars, Infinite Plates, and Tapered Bars, William D. Walther, Ford Motor Co., Dearborn, Mich. and C. M. Adams, Massachusetts Institute of Technology, Cambridge. The work presented by Dr. Walther includes the application of Bernoulli's theorem of the flow of metal as a means of predicting the flow of the metal in any localized area in the molds studies.

Gray Iron

■ Constantly increasing knowledge of the materials used in melting the metal is shown in the work discussed in Gray Iron sessions. New tests, evaluations, and cost-affecting considerations are discussed in the numerous papers presented for gray iron foundrymen at the Congress.

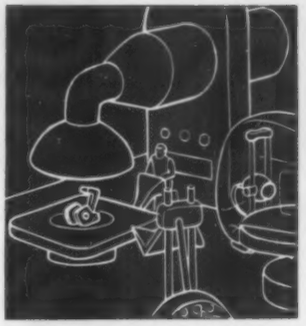
Service Life of Iron Castings Can Be Affected by Their Thermal Conductivity, J. A. Davis, H. W. Deem, and H. W. Lownie, Jr., Battelle Memorial Institute, Columbus, Ohio. Thermal conductivity can have a major influence on performance of a casting in service, according to this paper which was presented by J. A. Davis. It was pointed out that differences in thermal conductivities of irons may affect design specifications in many applications involving heat transfer. (Preprint 56-26)

Stress-Strain Relationship for Gray Iron, E. M. Stein, Battelle Memorial Institute, Columbus, Ohio. Stein presented typical stress-strain relationships for medium- and low-strength gray irons. He demonstrated that the curves are bowed from the origin, showing that these irons do not have a true modulus of elasticity. However, he found a definite relationship for all of the irons investigated by plotting the percentage of ultimate strength against strain, suggesting that the stress analysis of gray iron should be interpreted in terms of the percentage of the ultimate strength rather than in terms of stress. (Preprint 56-30)

Cracking and Life of Ingot-Molds, J. Duflot, Institut de Recherches de Siderurgie, St.-Germain-en-Laye, France. This study of cracking in light-weight molds for steel ingots was presented by E. Spire, E. Spire Co., Montreal, for M. Duflot. The research was a study of the causes of cracking in square ingot-molds. The effects of some foundry practices and of secondary elements in the chemical analysis was studied and discussed.

Cupola Operation, Gray Iron Shop Course featuring the following discussions: *Basic Cupola Operation,* Sam F. Carter, American Cast Iron

Elect New AFS Officers and Directors



Roger W. Griswold

Herbert Heaton

A. V. Martens

Garnet P. Phillips

Alex W. Pirrie

R. V. Righter

Gerald R. Rusk

■ Now in office as the elected officers of the American Foundrymen's Society are the nine men elected at the society's annual business meeting held during the Castings Congress.

Frank W. Shipley, foundry manager, Caterpillar Tractor Co., Peoria, Ill., has been elected to the presidency of the society for 1956-57.

Succeeding Shipley as vice-president is Harry W. Dietert, chairman of the board, Harry W. Dietert Co., Detroit.

The seven men elected to serve as national directors for three-year terms are:

Roger W. Griswold, superintendent, foundry division, Erie Malleable Iron Co., Erie, Pa., representing Malleable (Chapter Group E—Northwestern Pennsylvania Chapter).

Herbert Heaton, foundry superintendent, Letson & Burpee. Ltd., Vancouver, B.C., representing Gray Iron, Brass & Bronze, Aluminum (Chapter Group R—British Columbia Chapter).

A. V. Martens, president, Pekin Foundry & Mfg. Co., Pekin, Ill. Martens was nominated by the AFS board which names one nominee each year.

Garnet P. Phillips, general supervisor of foundry research, International Harvester Co., Chicago, representing Gray Iron (Chapter Group K—Chicago Chapter).

Alex W. Pirrie, vice-president of manufacturing, Standard Sanitary & Dominion Radiator, Ltd., Toronto, Ont., representing Gray Iron (Chapter Group D—Eastern Canada Chapter).

R. V. Righter, plant manager, Central Foundry Div., General Motors Corp., Danville, Ill., representing Gray Iron and Malleable (Chapter Group J—Central Indiana Chapter).

Gerald R. Rusk, president, Freeman Supply Co., Toledo, Ohio, representing Supplies (Chapter Group H—Toledo Chapter).

B. L. Simpson is automatically appointed to a one-year term on the board as the immediate past president of the society.

John S. McCauley had the floor during an education session.

Pattern speaker O. C. Bueg's remarks please J. W. Costello.

A. C. Sinnett outlines basic cost concepts at IE session.

An overflow crowd of over 500 packed Convention Hall auditorium to hear two papers on the CO_2 process: D. V. Atterton's Institute of British Foundrymen exchange paper and F. M. Scaggs "Coremaking with CO_2 Process."

B. G. Emmett presents a Steel paper written by Wm. D. Emmett.

V. Paschkis points out some heat transfer fundamentals.

A. M. Montgomery, first speaker for Metallography.

Pipe Co., Birmingham, Ala. Carter discussed fluxing of metal and delved into the chemical reactions in the cupola. *Water-Cooled Cupola Operation*, M. H. Horton, Deere & Co., Moline, Ill. The advantages and reasons for use of a water-cooled cupola were presented by Horton. He stated that since starting up a water-cooled cupola in 1954, his firm has reduced refractory cost appreciably, reduced cupola maintenance greatly while simultaneously increasing the melt capacity 25 per cent. *Acid Cupola Operation with Water-Cooled Tuyeres and Hot Blast*, H. E. Henderson, Lynchburg Foundry Co., Lynchburg, Va. Considerable carbon pick-up is noted in this type of operation according to Henderson who detailed the basic types of water-cooled cupola construction.

Hot-Blast Cupola Practice, Wilhelm L. Heinrichs, Fried. Krupp, Giesserie, Essen-Bredeney, Germany. A description of development of basic slag cupola practice from cold-blast to continuous hot-blast operation was presented by this overseas author. The inter-relations of the melting process, the thermal and metallurgical reactions were explained. (Preprint 56-22).

Development of Hot-Blast Cupola Melting Technique in Europe, Ernst Loebbecke, W. Strikfeldt & Co., Gummersbach, Germany. Loebbecke maintains that operating experience gather both from hot-blast cupolas with lining and without lining in the melting zone has shown that melting units can be controlled and regulated and have to be considered valuable metallurgical furnaces. He stated that the design and construction of the European hot-blast cupola is more complicated, but that the operation is not because of the use of automatic controls.

Selection of Materials for Gray Iron Melting. R. A. Clark, Electro Metallurgical Co., Div. Union Carbide & Carbon Co., Selection of the metal to be melted, lump alloys, ladle additions, and innoculants were covered in a review of the digestion problems of the cupola. "Hereditary" effects in gray iron were dis-

Noise Control luncheers were F. E. Frazier, Noel Symons, and chairman Allen Brandt.

Speaker J. E. Huss and author F. M. Scaggs gave their full attention during Sand Session.

Secretary R. H. Greenlee and author R. V. Righter check with Malleable chairman McMillan.

Gray Iron authors E. M. Stein and J. A. Davis flank session chairman Charles K. Donoho.

credited by Clark and called effects of one of more chemical constituants of the iron, possibly nitrogen. Use of innoculants was recommended as a practice that could be followed more widely.

Influence of Temperature on Mechanical Strength of Coke. John Varga, Jr. and H. W. Lownie, Jr. Battelle Memorial Institute, Columbus, Ohio. Experiments by the authors on the high-temperature strength of bulk coke indicate that its mechanical strength at elevated temperatures is not always related to strength at room temperatures. (Preprint 56-27)

Use of Pig Iron in Iron Foundries (with particular attention to specifications, prices, secondary elements, and "heredity".) H. W. Lownie, Jr. Battelle Memorial Institute, Columbus, Ohio. The author presents a compilation of information regarding the classification, testing, uses, prices, and the primary and secondary elements of pig irons. Effects of the primary and secondary elements of the pig iron in the manufacture of gray iron, nodular iron, and malleable iron castings is detailed. Included was a review of research into the "heredity" of pig iron. (Preprint 56-28)

Evaluation of Coke Quality by a Compressive Test. D. E. Krause and E. A. Lange, Gray Iron Research Institute, Columbus, Ohio. Compressive strength of 1 in. cubes of coke was found to be a useful test in evaluating coke quality. The authors recommend that coke not be judged on strength alone, but that a combination of ignition, reactivity, or combustibility tests be included to define coke quality. (Preprint 56-29)

Heat Treatment of Gray-Cast Iron, A. H. Rauch and J. B. Peck, Deere & Co., Moline, Ill. Hardenability of both alloyed and unalloyed irons in the strength range of ASTM Class 25 to Class 35 irons was determined by Rauch and Peck by means of the end-quench hardenability test. In presenting the paper, Peck discussed the effect on hardenability of chromium, nickel and molybdenum singly and in combination. (Preprint 56-25)

Sub-Surface Blowholes in Gray Irons and Their Association with Manganese Sulphide Segregation, W. G. Tonks, The British Cast Iron Research Association, Birmingham, England. Starting with the observation that as manganese content approaches the silicon content, there is greater tendency to form slag-like inclusion, Tonks, in a paper presented for him by George A. Timmons, Climax Molybdenum Co., Detroit, proceeded with experimentation that eventually permitted him to reproduce sub-surface blowholes experimentally. He concluded that for a given manganese and sulphur content, the incidence of sub-surface blowholes is increased as the pouring temperature falls. The experimental work indicates that low pouring temperatures are the primary factor in causing the defect. (Preprint 56-23)

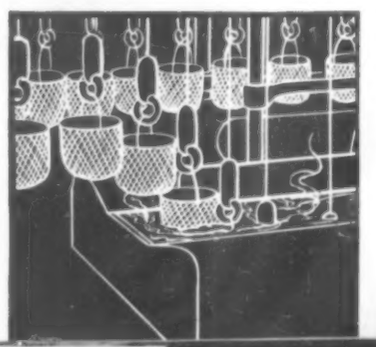
Causes and Effects of the Grain Size in Lamellar Gray Irons, Michel Ferry and Jean-Claude Margerie, Centre Technique des Industries de la Fonderie, Paris. (Official exchange paper from Association Technique de Fonderie, Paris. Presented by J. S. Vanick, International Nickle Co., New York.) A description of the laws governing the appearance and development of the crystal nuclei and of the principals involved in the solidification of alloys as applied to gray irons.

Casting Tolerances as Affected by Automation in the Machine Shop, E. L. Buchman, manager, Quality Control Department, Cleveland Foundry, Ford Motor Co. This paper, heard by a Joint Plant and Plant Equipment—Gray Iron Meeting, stated that automation has meant that production foundries must have better planning, closer control of processes and better than average inspection of castings. Greater precision is necessary. Material specifications must be maintained. It is necessary to chamfer cored locating holes and to check them 100 per cent with a templet gage. Core boxes, patterns, flasks and related equipment must also be continually checked. Good control of metal is required and adequate means of determining machinability must be used. Wherever possible the human element must be minimized or eliminated.

Blow-Hot Press Automatic Shell Molding Machine, R. S. Amala, J. H. Smith, A. L. Boegehold, and R. F. Thompson, General Motors Corp. Another paper at the joint meeting pointed to a new molding method employing blowing techniques for making large, uniformly contoured shell molds and a hot press process for curing them. An important part of the process is development of a shell molding mix compatible with blowing and press curing. Shells of resin coated sands have been made at the rate of 120 per hour but thermal shock problems have delayed their acceptance. An intimate mix of sand, resin and other ingredients was found to possess superior thermal shock resistance over coated sand mixes and this preparation, classified as a "semi-coated type" is the one used. (MODERN CASTINGS, May, page 62.)

Heat Transfer

■ Once a subject regarded as of interest only to high domed occupants of Cloud 7, the transient thermal problems involved in castings production have attracted the attention of many operating foundrymen, and this was reflected in both the papers presented at the Castings Congress and in the attendance at the session at which the papers were presented.



Of all honors accorded by AFS there are none greater than the Gold Medals and the Honorary Life Memberships. Above, AFS past president F. J. Walls shows a medal to 1956 medalists Harold F. Bishop, Charles C. Digerfoos and James S. Vanick. In the lower picture Walls presents Honorary Life Memberships to Joseph C. Pendleton, William D. McMillan and retiring president B. L. Simpson.

Temperature Drop in Pouring Ladles, Victor Paschkis, Columbia University, New York. Seven conclusions that Paschkis draws for the operating foundryman from his studies are: preheat the ladle; time is important in preheating; much heat loss occurs at the top of the ladle; the higher the preheat temperature, the more important the use of a lid; there is a critical lining thickness; preheating the lid is not important; increasing the thickness of the lining beyond 1 in. for ladles of 150 lb, or beyond 6 in. for ladles of 16,000 lb is without significance. (Preprint 56-43).

The Risering of Nadular Iron. Part III—The Effect of Pouring Temperature on Shrink Depth, R. C. Shnay and S. L. Gertsman, Dept. of Mines & Technical Surveys, Ottawa, Ont. Economic considerations demand close control over the pouring temperature of nodular iron, because the shrink depth of hypereutectic nodular iron castings varies greatly with the pouring temperature. The authors pointed out that small variations in the pouring temperature can make all the difference between producing a sound or an unsound castings. Their work showed the critical pouring temperature, above or below which the shrink depth increases, to be between 2325 F and 2375 F for hypereutectic nodular iron.

Transient Heat Flow, Victor Paschkis, Columbia University, New York. At the suggestion of the AFS Heat Transfer Committee, Professor Paschkis presented a basic description of the thermal problems in castings production.

Solidification Phenomena, W. S. Pellni, Naval Research Laboraory, Washington, D. C. Presented by H. F. Bishop, Naval Research Laboratory. Pellini prepared a resume of previous published papers in the area of research on the solidification of metals that applies to foundry practice.

Heat Treating Fundamentals, W. J. Childs, Lafayette College, Easton, Pa. Means to achieve the maximum physical properties of alloy castings through heat treating procedures were presented and discussed by Childs.

Largest group ever to hear an AFS banquet speaker listened to Norman Vincent Peale who was escorted into the banquet hall by President Bruce L. Simpson.

Industrial Engineering

■ Closer control over product, and the introduction of cost and incentive systems into the smallest plant may make life appear more complex, but it will become more profitable according to the authors of Industrial Engineering papers.

Pracitcal Foundry Application of Statistical Quality Control, Ross Martin, Jr., Rich Mfg. Co. of Calif.,

Los Angeles. Application of statistical quality control in the foundry by establishing standard variations in process and by applying control charts was presented by Martin. He placed particular emphasis on controlling casting weights and on control of molding sand. (Preprint 56-53)

Engineering, Cost, and Quality, J. M. Barrabee, International Harvester Co., Milwaukee, Wis. Barrabee stressed the designed of pattern equipment that is both designed and constructed to produce castings economically.

Basic Cost Concepts of the Small-Medium Foundry, A. C. Sinnett, Terre Haute Malleable & Mfg. Co., Terre Haute, Ind. The end point of a cost system should be a formula that will develop a cost, per unit of weight or per piece, of a casting from an individual pattern that reflects a sound basis for determining its selling price. It is necessary to know the cost activities provided to produce the casting and the cost of each activity. Accounting procedures should funnel costs to the proper cost centers, which are centers of operations within departments. Each general classification of expenses should also be considered a cost center. Knowledge of cost of operation and casting. Excessive costs have been pinpointed and corrected. The data gathered has permitted comparing alternative methods and equipment. The guess work has been taken out of pricing. Improvements continue under the incentive system.

Incentives in a Small Jobbing Foundry, Charles C. Erhart, Jr., and Herbert Wagers, The Chris Erhart Foundry and Machine Co. Each worker records his own work and keeps track of his downtime. Accuracy is good. By this procedure, one full-time checker is eliminated. In three years more than 100,000 separate standards have been set. Direct and indirect labor costs have declined 20 to 25 per cent. Prices as now set reflect the actual amount of work in each production centers also provides the groundwork for flexible budgets covering all indirect expenses, both labor and supplies. (MODERN CASTINGS, May, page 119.)

The Human Factor in New Equipment, John Taylor, Norris & Elliott, Inc., Columbus, Ohio. A selling job on supervision required to make equipment productive may be necessary if top management brings new equipment into the shop without properly conditioning those who are responsible for its operation, Mr. Taylor warned. Fail-equipment resulted in far lower productivity than should have been achieved. (Full story will appear in MODERN CASTINGS.)

ure to take the foreman into consideration is the underlying reason why many companies become dissatisfied with new equipment. Maximum efficiency can only be expected when the operation of the equipment is fully understood and the man responsible for its operation desires "to make the machine talk."

Taylor cited several instances in which management had purchased equipment without previously conferring with supervision. The latter learned about the new machines only when they were delivered to the plant. Resentment, misinformation, and resultant reluctance to experiment to determine the limitations and capabilities of the

Publications booth made AFS books and preprints available to Congress-goers.

Canadian dinner found dignitaries dining with members from the Dominion.

Light Metals

■ General advancement in casting techniques and in development of alloys is reflected in the papers presented by the Light Metals Division.

Centrifugal Casting of Unusual Shapes in Non-Ferrous Alloys, J. P. Krishon, Centr-O-Cast & Engineering Co., Detroit. The centrifugal process is basically simple and its cious use of die lubricants, the authors reported. Occluded oxides and sludge inclusions can be avoided by proper melting and fluxing, and by controlling temperature and not charging cold scrap, respectively. (MODERN CASTINGS, July.)

cost cutting potentials should not be overlooked, the author said, in describing production of an aluminum adapter plate in a spinning permanent mold. Sounder castings were produced, he stated, and a saving of 40 per cent was made through two-molds-per-man operation, high yield, and extensive savings in cleaning. (MODERN CASTINGS, May, page 69.)

Machinability of Aluminum Die Castings, D. L. Colwell and Oldrich Tichy, Apex Smelting Co., Cleveland. Common difficulties in machining the typical die casting alloy SC84A were considered. Porosity can be eliminated by proper gating and venting, and by judi-

Novel Aluminum Engine Die Castings, E. N. Jacobi, Briggs & Stratton Corp., Milwaukee. Four-cycle, one cylinder air-cooled engines were redesigned for production by die casting without bore sleeves and with integral crankcases. Design and mold construction were coordinated to produce a variety of engines from the same major

continued on page 91

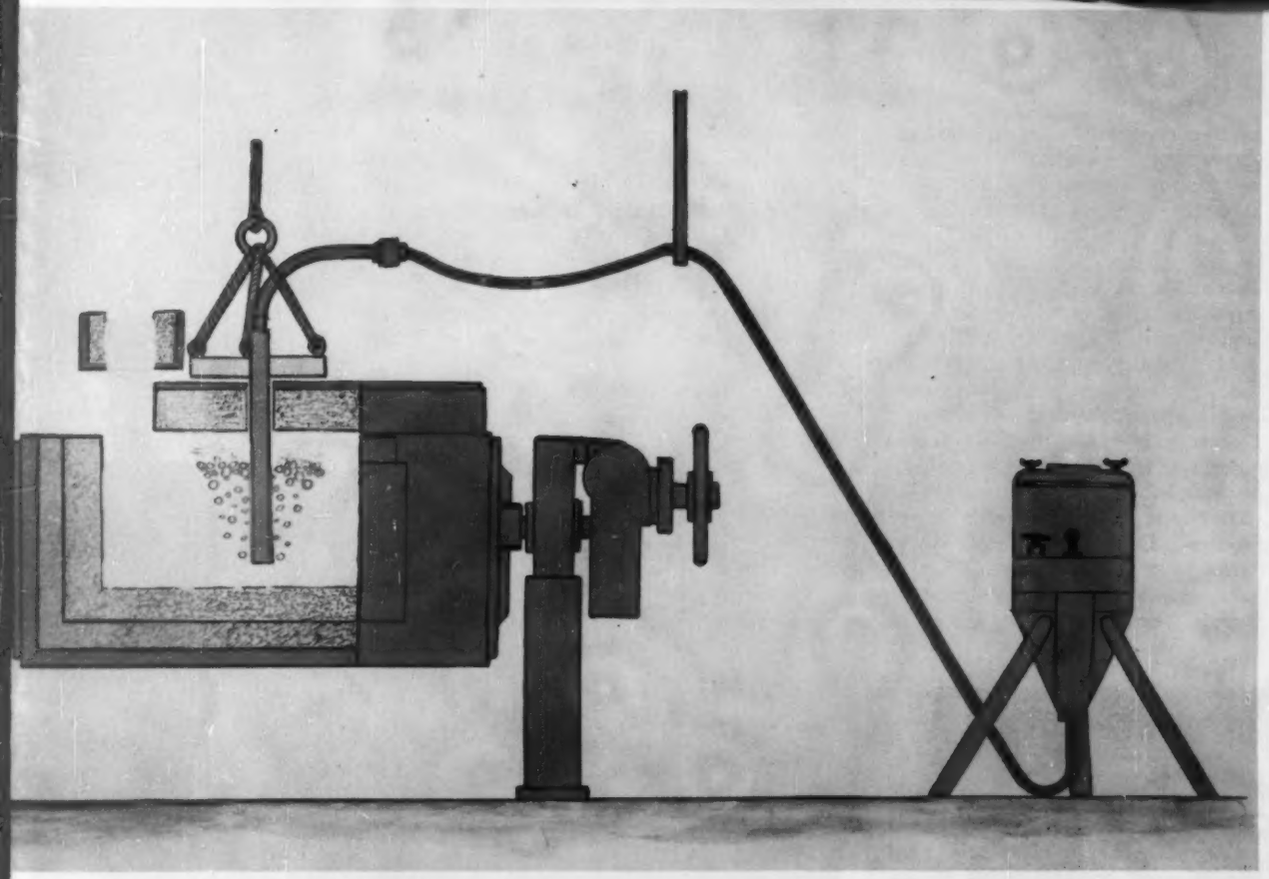


Fig. 1 . . Mixing ladle with injection tube lowered through cover. Injection unit and controls are at right.

WHAT IRON FOUNDRIES ARE DOING WITH THE INJECTION PROCESS

GEORGE P. DAHM / *Project Eng.*
Development Laboratory
Linde Air Products Co.

Desulphurize . . . Increase Carbon . . . Upgrade Mechanical Properties

■ The injection process is being used in iron foundries to desulphurize, to increase carbon, and to introduce inoculants for the production of nodular iron. Developed after World War II, the injection process consists of entraining a finely divided solid in an inert gas and, by means of a tube, introducing this solid material below the surface of molten metals. Advantages vary with the application.

The injection process was initially developed as a practical means of making use of the desulphurizing ability of calcium carbide. It was apparent from Bureau of Mines work that some means of introducing and dispersing the calcium carbide below the surface of the molten iron was necessary. The first production-scale work done with the injection process was in steel mills where calcium carbide was injected for the desulphurization of hot metal. The results of this work were inconclusive in determining the value of desulphurized hot metal but did prove the practicality of the injection technique.

At that time, there was an added incentive for the production of low-sulphur cast irons in the foundry because of the increasing attention being given nodular iron. The injection process was well suited for the production of the low-sulphur starting material required. Once put to use in the foundry, other applications of the injection process became evident.

■ **Desulphurization.** Injection of calcium carbide or desulphurization has permitted the production of cast iron with sulphur contents of less than 0.015 per cent. In the manufacture of nodular iron, a low-sulphur starting material has several advantages. Since the common nodulizing agents are also desulphurizers, a low starting sulphur requires the use of less alloy. This is an economic advantage in itself. In addition, the amount of dross formed in nodular iron has been found to be a function of the quantity of alloy used so low-sulphur base metals have the added advantage of producing cleaner nodular castings.

The injection of calcium carbide for desulphurization has been applied in the foundry chiefly as a pretreatment for the production of upgraded or nodular irons. As yet, the value of extremely low sulphur contents in other applications has not been fully investigated. There are promising indications that low-sulphur irons need smaller additions of alloying elements to develop the desired physical properties.

Flexibility of the injection process enables foundries ranging from small job shops to large captive shops to include the treatment in their operations. The process is presently used to produce castings varying in weight from 1 to 2 lb up to 25,000 lb. By far the most common method of treatment is one wherein only certain ladles are desulphurized. There are, however, semi-continuous treating installations also in service. Since batch or ladle treatments are prevalent, examples of actual installations of this type are considered first.

One small job shop using a cupola with intermittent tap makes the calcium carbide injection in the holding ladle. The ladle is a straight-sided open ladle of about 1000-lb capacity which has been modified by the addition of a teapot spout. The well of the cupola has a capacity in excess of 800 lb of iron. A single tap, therefore, fills the ladle to the desired level.

When filled with 800 lb of iron,

14 lb of calcium carbide are injected using a single dispenser and a 2-in. OD by 1/2-in. ID graphite injection tube. Approximately 25 sec are required for the injection. This quantity of calcium carbide reduces the sulphur from about 0.07 per cent to about 0.01 per cent. The 0.06 per cent sulphur reduction has permitted the foundry to reduce the amount of nodulizing alloy used by 40 per cent. The teapot spout permits the pouring of the treated iron without first skimming off the carbide slag. After the iron has been poured into the transfer ladle, the holding ladle is inverted and the slag falls free. Thus, no hand skimming is involved.

In batch treatment in foundries, the other extreme in size is represented by a captive foundry producing nodular castings having poured weights up to about 25,000 lb. Section sizes are as large as 10 in. This foundry operates one intermittent-tap acid-lined cupola with no holding ladle and has an entirely different mechanical problem to overcome in using the injection process. Since the well capacity of the cupola is about 8000 lb, three full taps and one small tap are required to collect 25,000 lb of iron. The time from first tap to last tap is approximately one hour.

To desulphurize 25,000 lb of iron requires injection of about 400 lb of calcium carbide, and the total injection time is approximately 18 min. To minimize time lost after the last tap, each tap is treated as soon as it is completed. Two dispensers are used. Both are connected to a single injection tube, permitting one dispenser to be recharged while the second dispenser is operating. Temperature loss due to the treatment is nominal, since the blanket of carbidic slag provided by the injection actually reduces heat loses during the holding time.

To withstand the mechanical strain caused by the deep immersion and to lengthen the interval between tube replacements, a 4-in. OD by ½-in. ID graphite tube is used. With a tube of this size, preheating the tube and tapering the lower end have been found to promote smoother starting of the injection. These special techniques are not necessary on the usual 2-in. OD graphite tubes.

As in the first foundry, the desulphurizing treatment has permitted significant saving in nodulizing alloy and has also lessened the amount of dross occurring in the large castings. This reduction in dross has enabled the foundry to reduce the allowance for machining on each casting and thus affect a saving both in metal required and subsequent machining time.

Another captive foundry pouring nodular castings with a poured weight of approximately 6000 lb uses an installation that may be called semi-continuous. The melting equipment in this shop consists of an acid-lined cupola lined to 55 in. An 8000-lb mixing ladle is used for desulphurizing (Fig. 1). An overhead crane is used to position the injection tube which is inserted through a hole in the cover of the mixing ladle after the completion of each tap. At the completion of the injection, the tube is removed before the ladle is poured.

Usual practice is to tap about 7000 lb of iron and to treat this quantity of metal with 100 lb of calcium carbide. The injection takes approximately 3 min. One dispenser is used, connected to a 2-in. OD by 1/2-in. ID graphite tube. Since the mixing ladle has a teapot spout, the iron can be poured while the slag is held back in the ladle. When the volume of slag reaches the lip of the ladle, some slag is rabbled out.

At the end of the nodular run which is always the first part of the heat, the slag remaining in the ladle is left throughout the rest of the melt. At the conclusion of the day's melt, the ladle is inverted and the slag dumped. Approximately the same amount of cleanup work is required on the ladle under these conditions as is necessary after a day's run without the use of carbide. The practice of leaving the slag in the ladle eliminates the need for handling the hot slag and does not result in any increased refractory wear.

The desulphurization accomplished by injection has enabled this foundry to reduce the nodulizing alloy addition by 50 per cent—from 3 per cent to 1-1/2 per cent. The reduction in alloy is important not only from the standpoint of economics but also in that it avoids overtreatment. Since the castings require a fully ferritic structure as-

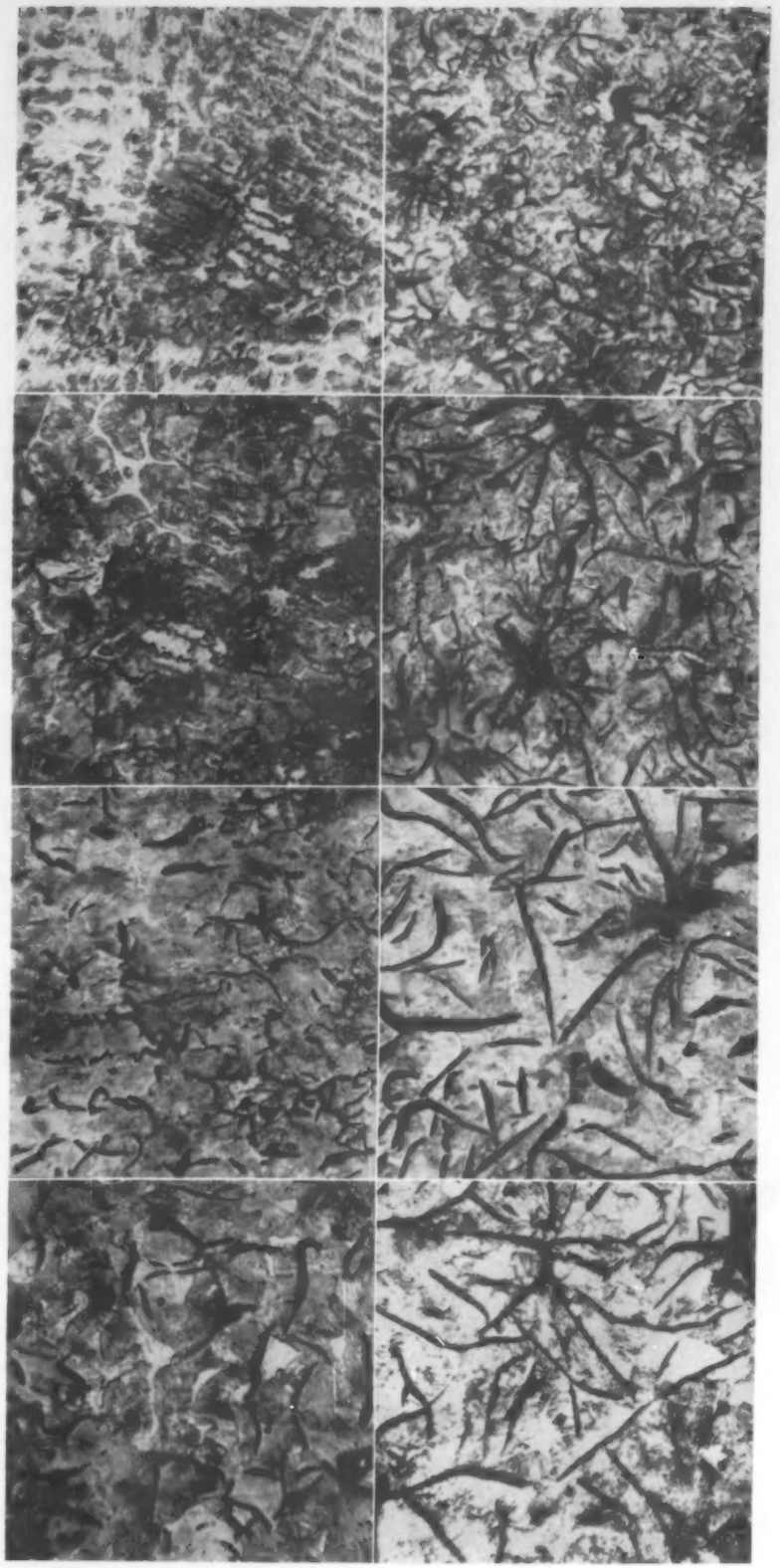


Fig. 2 . . Effect of combined desulphurization and carbon increase in step bar. Untreated, left; treated, right. Sections, from top, ⅛, ¼, ½, ¾ in.

Fig. 3 . . Pouring ladle is filled while the slag is rabbled off.

Fig. 4 . . Dispenser stage for graphite-calcium carbide injection.

Fig. 5 . . Box on front slagger permits continuous injection.

cast, any carbides formed by overtreatment would result in rejection. The uniformity of the starting material provided by the injection treatment has practically eliminated rejections.

Desulphurization by continuous injection has not been applied on a production basis yet because of the difficulties experienced with graphite tube life. Refractory tubes are subject to failure because of thermal shock and are, therefore, unsatisfactory. Some tests have been made with composite tubes.

▪ **Carbon pickup.** A relatively new use for the injection process is in raising the carbon content of cupola irons in the ladle. Foundries have found that it is now as simple to raise the carbon content of cast iron in the ladle as it is to raise the silicon content. This has made it possible for the foundry needing only occasional ladles of high carbon iron to produce it without the bother of special charges and coke spreaders.

Other foundries requiring a continuous supply of high carbon iron have substituted the injection process for the use of expensive raw materials in the charge. The high carbon is desired in some cases for increased machinability, in others for decreased chill, and in still others for modified physical properties.

The mechanics of the carbon-raising injection are quite simple. In most cases, a mixture of carbon in the form of electric furnace graphite powder and calcium carbide is used as the injection material. Other carbonaceous materials have been tried, but the efficiency of electric furnace graphite powder is higher than that of other materials tested. Efficiency is affected by several factors in addition to the type of material injected. High temperature favors the solution of carbon in iron. A low-carbon equivalent in the iron likewise favors carbon pickup.

Calcium carbide serves the dual purpose of improving the flowability of the graphite and effecting desulphurization during the injection. Even if desulphurization is not required by specification, any reduction in sulphur will be of benefit in two ways: (1) Lowering the sulphur content of iron reduces the chill tendency, and (2) low sulphur apparently favors the rapid solution of carbon in iron.

Mixtures of 50 per cent graphite-50 per cent calcium carbide, 60 per cent graphite-40 per cent calcium carbide, 70 per cent graphite-30 per cent calcium carbide have been tested. The first two mixtures dispense with no difficulty, and the choice between the two is based primarily on the desulphurization desired. During tests, the last mixture consistently failed to flow properly. Sizing and the general nature of the graphite powder have a great effect on the dispensing characteristics of the mixture.

The most satisfactory graphite powder used to date has a particle size analysis of essentially all –35 mesh and +100 mesh. This seems to be the best compromise between fine material to promote rapid solution in the iron and coarse material to obtain optimum flow characteristics.

As an example of the batch type treatment, there is a job shop that treats only a small part of its total production to produce special castings with good machinability. The treatment in this foundry is carried out in the holding ladle, which is usually emptied before each successive tap. The injection tube is handled with a small electric hoist. This foundry has found that a 1 per cent injection of 50-50 mix gives both carbon pickup and desulphurization. The table shows the results obtained with this treatment.

	Untreated	Treated
TC, %	3.31	3.79
GC, %	2.22	2.94
S, %	0.16	0.041
Si, %	1.77	1.86
P, %	0.35	0.35
Mn, %	0.52	0.52
Bhn	168	130

Step bars have been cast from both untreated and treated metal in this foundry. The graphitization effect of the injection treatment can readily be seen in Fig. 2 of these illustrations.

Another foundry is successfully using the desulphurizing and graphitizing injection to provide continuous treatment. Savings in raw materials and improvements in the final product are the reasons. This plant operates two acid cupolas, one in the fittings shop and the other in the soil pipe shop. The two methods of injection differ.

At the fittings shop, the injection is made in the mixing ladle. The cupola is equipped with a front slagging spout and melts 12 to 14 tons per hour. The usual melt is 8 hr. The mixing ladle has an acid lining. For injection, a 2-in. OD by 1/2-in. ID graphite tube is connected to an air cylinder so that it may be lowered for injection and then withdrawn during the idle periods. This has greatly increased the life of the graphite tube.

An injection of 14 lb of the 60 per cent graphite-40 per cent calcium carbide mixture is made after each transfer ladle is filled. The injection is made after each ladle rather than before to minimize the delay in the flow of ladles to the pouring floor. The injection takes about 50 sec and the period between the injections varies from 2 to 5 min. This variation in time between ladles and consequently in time between treatments causes some inconsistency in results. The spread is quite small, however, and has caused no difficulty in operations.

Figure 3 shows the installation with the graphite injection tube in the withdrawn position. A transfer ladle is being filled and some of the accumulated slag is being rabbled off. Figure 4 shows the dispenser platform. Two dispensers are connected to a single injection hose and tube, permitting one dispenser to discharge while the other is being refilled. The air-cylinder control for positioning the graphite tube is situated at this location. The dispenser being discharged is placed on a scale for accurate control of the small quantities of mix involved.

In short-time injections such as this, variations in start-up time make it difficult to control the quantity injected by time alone. This injection raises the carbon content of the iron from a spout analysis of about 3.15 per cent to an as-cast analysis of about 3.50 per cent. The sulphur is reduced from a spout analysis of about 0.120 to an as-cast analysis of about 0.060 per cent. The silicon in this iron is approximately 2 per cent.

In the pipe shop, a special box has been added to the regular front slagging spout and the injection treatment is made in this box. With

the exception of the hole for the injection tube and the opening through which the slag is withdrawn, the entire box is enclosed with refractory. This serves to confine metal splash. The cupola slag is separated from the iron before entering the box in which injection takes place.

Figure 5 shows how the box is fitted to the side of the regular spout. This location makes it possible to divert the iron through the box, when injection treatment is desired, or to block off the box and run the molten iron straight down the runner when not treating. Operating procedure consists of making a 6-lb injection of 60 per cent graphite-40 per cent calcium carbide mixture once each minute when the melting rate is 17 tons per hour. The injection takes about 30 sec and then the tube is withdrawn for 30 sec. As in the fittings shop, the graphite tube is manipulated by an air cylinder controlled from the dispenser location.

In this foundry, the application of the injection process has enabled utilization of cheaper raw materials, reduced the amount of silicon addition required, materially reduced the breakage during shakeout, and improved the machinability of the castings produced. The saving in raw materials alone more than offsets the cost of the treatment.

■ **Upgrading.** Many experiments have been undertaken to develop a method of using the injection technique for producing upgraded or nodular irons. The advantages to be realized—namely, more consistent results, less flare and splash and lower alloy consumption—have been apparent to those people working with the injection process. Operational difficulties have held back the application of the injection process to this field.

Most materials used for producing nodular iron by the bulk addition method are alloys containing magnesium or cerium and magnesium. All these alloys have relatively low melting points and, therefore, present problems during injection. Any material that melts significantly below the temperature of the metal being treated has a tendency to fuse in the injection tube and interfere with further injection.

There are two methods of avoiding this difficulty: (1) the use of materials with melting points above the temperature of the metal being treated, and (2) the inclusion of high melting point diluents. The first approach is limited by the high melting point materials available. It eliminates all of the common alloys and leaves only the less active forms of cerium and magnesium such as the oxides. The better choice seemed to be the use of the proven alloys with sufficient diluents to prevent fusing difficulties.

As originally applied, this approach had the disadvantage of requiring additional injection time and expense, since properly sized diluents add to both the bulk and the cost of the mixture. Temperature loss is also increased by the long injections. A recent development in upgrading mixes, which is presently being field tested, has reduced the amount of diluent required to about one-tenth of that used in the present commercial mixes. This material promises to eliminate the above-mentioned disadvantages.

In spite of these limitations, the process has been accepted in several foundries. In each instance, the injection process for upgrading has been applied as a ladle treatment, since the nodular iron produced by the injection treatment has fading tendencies similar to those of irons produced by he bulk addition. To minimize the amount of upgrading mix that must be injected, a low-sulphur starting iron is desirable. In shops melting with acid cupolas, a pre-injection of calcium carbide is indicated to provide this low sulphur starting material.

One small job shop producing nodular castings requiring good heat conductivity uses the following procedure: The iron is melted in an acid cupola operated with an intermittent tap. A small mixing ladle is used as the treating vessel. As each tap is made, an injection of 1.75 per cent calcium carbide is made and then, without removing the carbidic slag, an injection of 3 per cent of commercial upgrading mix is made.

The mixing ladle is equipped with a teapot spout so that after treatment the iron can be poured into a transfer ladle without any carry-over of the slag produced during the injections. The mixing ladle is emptied after each treatment so that no treated metal remains. This eliminates trouble with fading or overtreatment. In this plant, one of the prime advantages of the injection treatment is the cleanliness of the nodular iron produced.

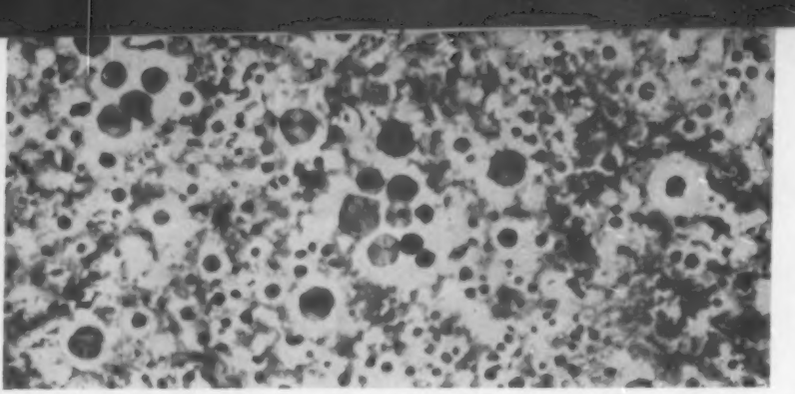


Fig. 6 . . Injection process produces nodular iron in small jobbing shop.

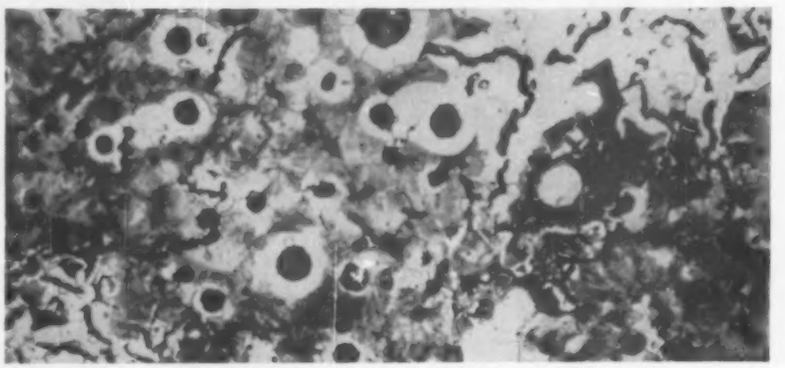


Fig. 7 . . Partially nodulized iron can be made by adjusting injection.

Because of their poor heat conductivity, any inclusions tend to produce hot spots in the castings in service. The metal produced by this treatment is shown in Figure 6. This is the as-cast condition. The analysis of the treated metal shown in the illustration was:

	Per Cent
Carbon	3.66
Sulphur	0.007
Silicon	2.53
Manganese	0.47
Phosphorus	0.06
Magnesium	0.008

In an attempt to improve heat conductivity, this same foundry has used the injection process to produce upgraded iron that was not fully nodular. Here the heat conductivity has been increased from that of nodular iron to almost that of gray iron, but the growth tendency of gray iron has been suppressed. The as-cast structure produced is shown in Figure 7. Both nodular and flake graphite can be seen in this photograph.

The service life of this material has proven very satisfactory. The usual ladle treated in this foundry is approximately 800 lb. In such small ladles, temperature considerations are important; but good melting practice and proper scheduling on the pouring floor have prevented any difficulties.

Several foundries have adopted the injection process to produce nodular iron from molten iron produced in a basic cupola. In these foundries, the injection is made in ladles ranging from 2000 to 4000-lb capacity. An injection of 2-1/2 per cent of commercial upgrading mix has produced good nodular iron.

■ **Acknowledgement.** The author would like to express his sincere thanks to the management and personnel of the following foundries for their cooperation in supplying production information and photographs: Alamo Irons Works, Kelley Foundry Co., and Western Foundry Co.

How DESIGN and OPERATION

Too little is known about what comes out of a stack and where it goes

■ To properly develop and design equipment to meet the needs of the industry which it serves, an equipment manufacturer must know that industry's processes and needs and anticipate its requirements wherever possible.

The trend in the foundry today is toward economy of operation, usually by better material handling methods and the use of preheated blast air in cupola operation. Civic minded foundrymen will install collection equipment to suit their individual needs.

Very little is known today on the actual amount of total emissions being discharged from cupolas. With melting rates ranging from 3 to 30 tons per hour and higher, most foundries will have one or two cupolas in operation at any given time. Dust loading will vary considerably, as will the mean particle size. The lighter dust loadings will consist basically of metallic fumes, while the heavier concentration will include coarse particles of charged material picked up by the stack gases.

Information to date, indicates total dust emissions in the range of 10 to 45 pounds per ton of melt.

With the cooperation of a large midwestern foundry, we undertook the task of determining for ourselves, by our own methods, the exact amount of material discharged from a cupola stack. The cupola selected had an 87-in. ID and was equipped with the hot blast system shown in Fig. 1. A cupola of this type can melt with relative ease up to 25 tons per hour. Tests were to be conducted at the following rates:

- 12 to 15 tons with hot blast and gas igniters
- 18 to 20 tons with hot blast and gas igniters
- 23 to 26 tons with hot blast and gas igniters
- 18 to 20 tons with cold blast and gas igniters

For accurate sampling, it is essential that a study of the gas flow be made, as considerable disturbance is encountered by entry of air through the charging door opening. Pitot tube readings at two levels indicated the gas flow pattern after which our sampling point selection was made.

Our sampling kit consisted of a recently developed small diameter dry centrifugal cyclone cell arrangement (Fig. 2). This equipment having a potential capacity of 3000 cfm, could draw off sufficient gas, which in our opinion, would be a representative sample of the total gas volume. An 18-in. diameter duct connection was required so that isokinetic sampling could be maintained. This takeoff was placed in the center of the cupola as it was found by previous tests that the velocity at this point remained quite constant.

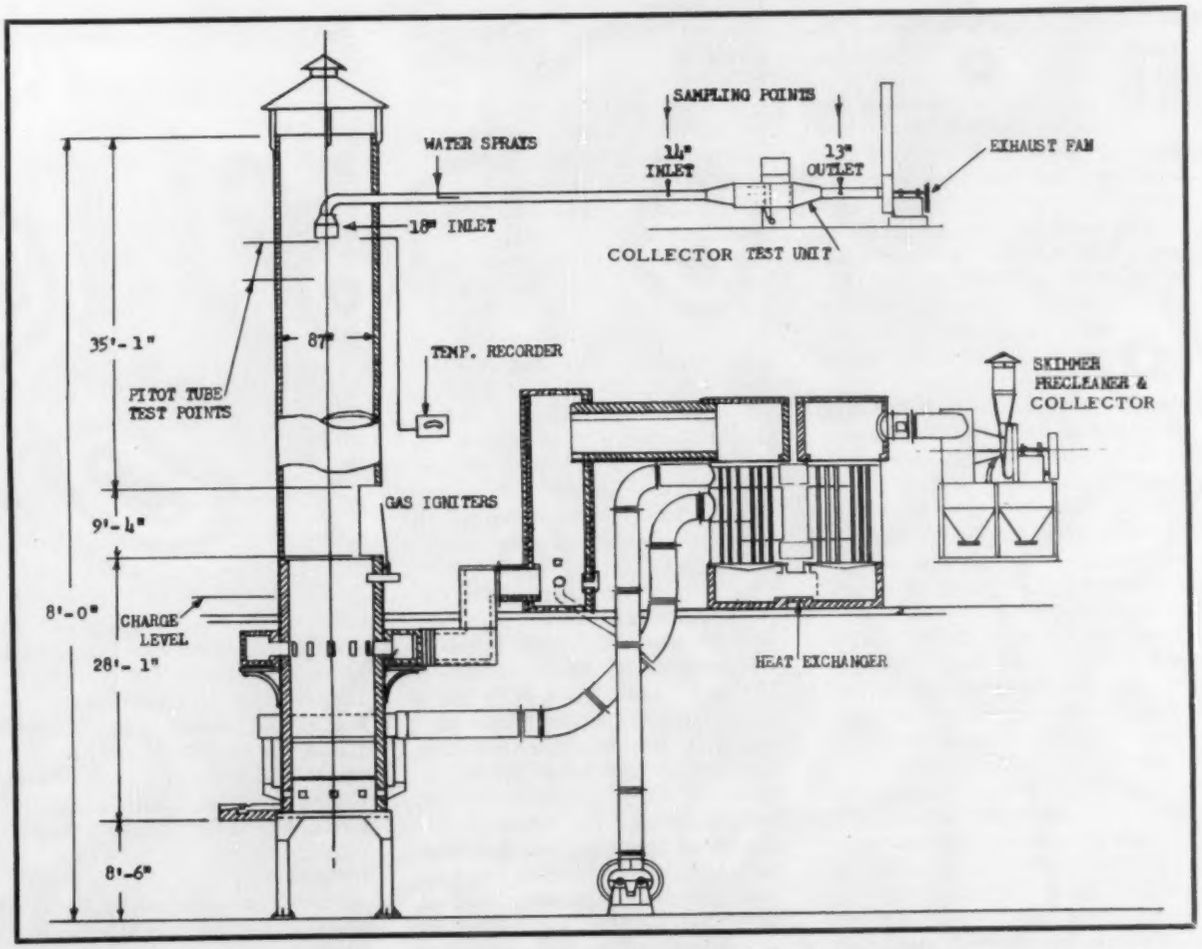


Fig. 1 . . Hot blast cupola with collector on heat exchanger and test unit to measure emission from stack.

A diagramatic sketch of our test arrangement is also shown in Fig. 1. Typical gas flow pattern through the sampling kit is shown in Fig. 3. Since it was impossible to take actual photos of the equipment as applied to cupolas, a previous test arrangement using identical equipment has been substituted (Fig. 4).

Advantages of handling large volumes of gas are:

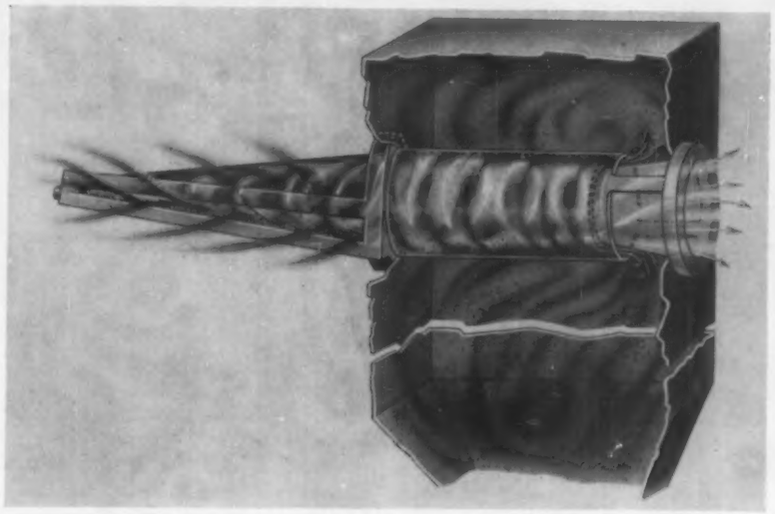
- A small volume sampler can be placed before and after collector.
- Provides double check for test since comparison can be made between inlet and outlet samples. Also between dust in hopper of collector and outlet pad.

Sampler used contained 144 sq. in. of No. 50 F. G. (glass fiber) filter media. Prior to any testing, gas burners were installed at charging door level to complete combustion in the stack, and to reduce the density of the discharged gases. Ordinarily, the type of hot blast system involved produces very little flame in the stack, especially when operated at high coke ratios.

The first test was made with hot blast in operation melting at the rate of 13.2 tons per hour. A total of 89 lb of dust was emitted to the atmosphere per hour. Of this

INFLUENCE CUPOLA EMISSION

RAY C. ORTGIES / *Foundry Engineer*
American Air Filter Co., Inc.
Louisville, Ky.



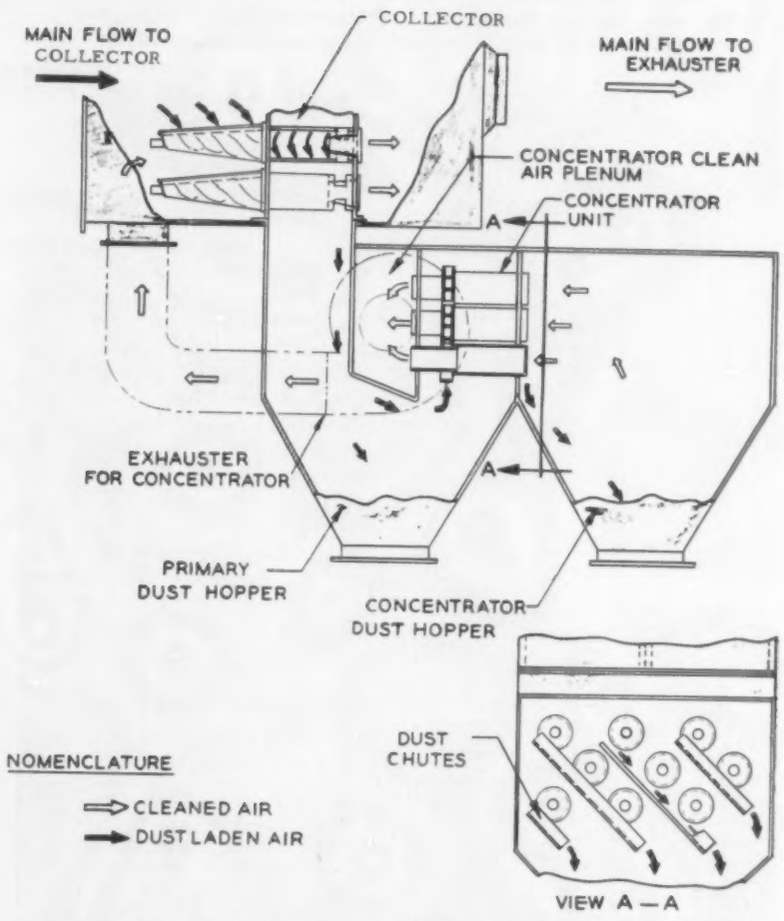


Fig. 2 and 3 . . Collector and hopper detail (below). Above, sampling cell.

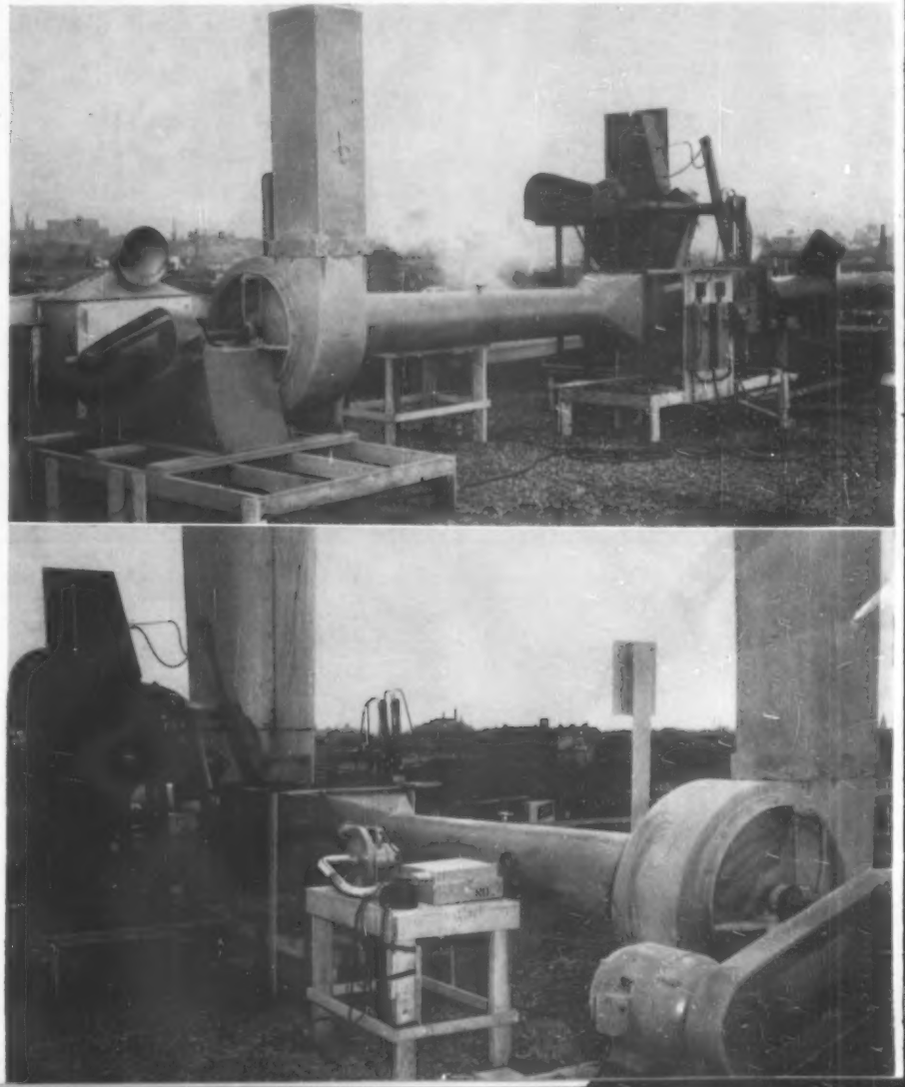
amount, 58 lb was caught by the sampler. Comparative efficiencies of inlet and outlet samples was 65 tests on the same day under identical conditions produced similar results.

Additional tests were made at 19, 23, 24, and 26 tons per hour melt (Table 2). At 19 tons the dust discharge increased considerably, whereas the emissions increase recorded on the outlet pad were slight. Collectance efficiency increased considerably. At the cupola's full rating of 23 to 26 tons the total dust discharge again increased, whereas collector efficiency remained constant.

The test pads were analyzed by our laboratory; results are shown in Fig. 5. Using an 80-ft stack and 5 mph wind as a basis for our calculations, we have projected the theoretical dust distribution in pounds in relation to particle size in microns (System 1).

Previous tests on the hot blast system collector indicated 14 lb of dust being emitted to the atmosphere per hour. Assuming an effi-

Fig. 4 . . Two views of stack emission test setup on roof of foundry.



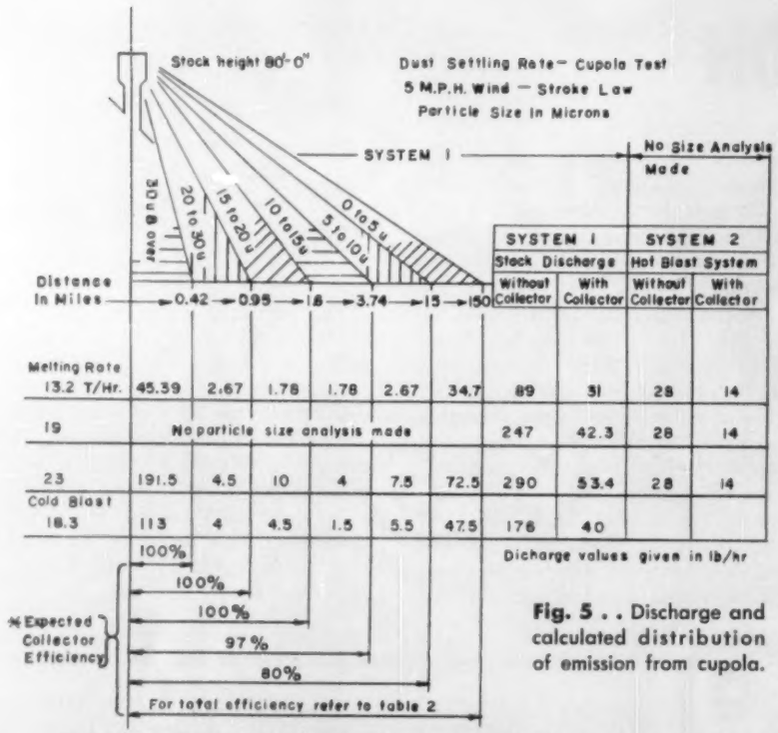


Fig. 5 . . Discharge and calculated distribution of emission from cupola.

ciency of 50 per cent, a total of 28 lb of dust should be added to the total emission rate (Fig. 5, System 2).

A series of tests was run using the cold blast principle at 18.3 tons per hour. Almost identical results were obtained in total emissions, dust concentration, etc. At this writing it is impossible to offer a comparison between cold and hot blast cupolas.

Factors which enter into the design of cupolas which influence the emission of dust to the atmosphere are:

■ **Bed Height.** Of prime importance is bed height, which in all cases should be of sufficient depth to maintain an ample reserve of raw materials above the melting zone between charges. Coke is a natural filter and traps much of the dust being forced through the charge by the expanding burning gases.

■ **Charging Doors.** Of necessity the door size must match the charging system. Extra large doors present problems when capping cupolas for dust control systems of any type.

■ **Stack Height.** The stack above the top of the charging door is a very economical combustion chamber. The overall height is directly dependent on the charging door size. However, in most small cupolas to size No. 4 25 ft should be considered, No. 5 to 7, 30 ft and No. 8 to 12, 35 to 40 ft.

■ **Igniters.** In order to help correct the cupola emission problem, it is necessary to burn the carbon monoxide gas with as much of the combustible particulate matter as possible. For this purpose gas and oil fired pilot igniters are usually placed slightly above the maximum charge level.

Examination of test pads and materials collected in the collector hopper indicated a color differential when igniters were used. With burners in operation and combustion in stack complete, the color was metallic gray. Where no burners were used, the color was brown, indicating unburned carbon.

■ **Material Handling.** A good part of the dust discharge directly related to the type of material being charged. Dirty scrap in the gas stream is purged of its dust coating. Coke containing excessive amounts of breeze is a contributing factor. Tests conducted over several years indicate that 33 per cent of the total discharge occurs through material handling. Proper placement of the charge in the cupola is desirable. Even distribution of materials requires the gas to filter through the entire bed and prevents open spots. Irregular distribution provides quick escape routes of the gases at high velocity contributing to higher discharge rates.

■ **Blower Air Volume.** Blower air volumes should be held to moderate levels and operated in accordance with good foundry practice. Excess air in addition to creating melting problems contribute greatly to the amount of dust discharged.

TABLE 1 . . HOT BLAST CUPOLA TEST RUNS AT LOW MELTING RATES

	Run No. 1			Run No. 2			Run No. 3		
Cupola Stack Temp., F	1050			1050			1050		
Cupola Air Vol., cfm	73,000			73,000			73,000		
Cupola Air Vol., 70 F, scfm	26,000			26,000			26,000		
Cupola Tonnage, t/hr	13.2			15.5			15.5		
Blast Vol., 70 F, scfm	8000			8000			8000		
Coke Ratio, Iron:Coke	10:1			10:1			10:1		
	Inlet 14 in.	Outlet 13 in.	Conc. Hopper	Inlet 14 in.	Outlet 13 in.	Conc. Hopper	Inlet 14 in.	Outlet 13 in.	Conc. Hopper
Collector Temp., F.	425			425			425		
Collector Air Vol., cfm	2780			2780			2780		
Collector Air Vol., scfm	1670	1670		1670	1670		1670	1670	
Sampled Air Vol., scf	186.0	212.4	100,200/hr	186.0	209.4	100,200/hr		208.8	100,200/hr
Sampled Dust Weight, grains	73.5	29.9	32,280	52.0	20.2	25,500		22.65	21,000
Dust Concentration, grains/scf	0.395	0.14	0.32	0.28	0.0965	0.254		0.106	0.21
Cupola Emission, lb/hr	89			62.4					
Collector Emission Based on Cupola Air, lb/hr		31	71.4		21.5	56.6		23.5	46.7
Efficiency, %			69.5			72.6			67.0
Test Pad Efficiency, %	65			65.5			None		

TABLE 2 . . SUMMARY OF HOT AND COLD BLAST TEST RESULTS

Type Blast	Melting Rate	Cupola Air Volume	Volume @70 F	Blast Volume	Coke to Iron Ratio	Inlet Dust Conc., scf	Outlet Dust Conc., scf	Coll. Dust Conc., scf	Total Emission, lb/hr	Emission with Coll., lb/hr	Efficiency Test Pads, %	Efficiency Hopper Catch, %	Stack Temp., (Avg.) F
Hot	13.2	73,000	26,000	8000	10:1	0.395	0.14	0.32	89	31	65	69.5	1050
Hot	15.5	73,000	26,000	8000	10:1	0.28	0.0965	0.254	62.4	21.5	65.5	72.6	1050
Hot	19	77,000	27,000	10,350	10:1	1.065	0.183		247	42.3	82.8	Dust not weighed	1050
Hot	19	77,000	27,000	10,350	10:1	Sampler failure	0.165	0.785		38		82.6	1050
Hot	24	62,000	27,000	11,350	11:1	1.19	0.252	1.052	316	67	78.8	80.2	600
Hot	26	62,000	27,000	11,350	11:1	1.213	0.226	0.913	323	60	81.4	80.2	600
Hot	23	62,000	27,000	11,350	11:1	1.09	0.201	0.883	290	53.4	81.6		600
Cold	18.3	83,500	27,000	9340	8:1	0.762	0.173	0.69	176	40	77.3	80	1200
Cold	18.3	83,500	27,000	9340	8:1	0.782	0.184	0.738	191	42.6	76.5	80.3	1200

Omission

Company affiliation of Glenn W. Merrefield, one of the contributors to "The Foundry of Tomorrow," the Bonus Section of the May issue of MODERN CASTINGS, was inadvertently omitted on page 90. He is senior engineer with Giffels & Vallet, Inc., Detroit.

MOISTURE MEASURING on a Small Budget

Sand control starts with frequent, accurate moisture measurements

GEORGE DISYLVESTRO / *Sand Control Supv.*
Burnside Steel Foundry Co.
Chicago

■ Moisture control is an absolute necessity for sand control. For about $35 it is possible to build a moisture tester that will deliver accuracy within 0.1 per cent in five minutes.

Our home-made device consists of a 250-watt infrared bulb mounted with an electric socket to an ordinary threaded pipe. The bulb is suspended over one plate of an equally ordinary beam balance. Around the bulb is a tin can, and a timer is used to shut off the bulb at a predetermined time. That's all there is to it.

It is important to center the bulb inside the tin can shield to insure air circulation. Height is determined by a thermometer in the sand; it should read 220 to 300 F. Above 300 F cereal and wood flour start to burn out. With about 50 grams of sand evenly distributed on the pan, calculations taken after five minutes will be accurate to within plus or minus 0.1 per cent.

For a laboratory where multiple moisture tests are made and a lab balance is available, multiple units are very useful. Multiple units are made by wiring any number of lights in parallel, all in series with one timer. Tests are run simultaneously on as many stations as desired.

Single low-cost units may be placed at stations of importance such as the core room mill, facing mill, and refractory lining mill. They give each operator a quick determination before he discharges a batch of sand.

Life expectancy of the bulb is about six months. Timers have been in operation an average of 25 times per day for 15 months now. One batch of sand out of moisture range would undoubtedly pay for the unit in scrap or repair costs saved.

Moisture measuring set is easily assembled from readily available units.

Core room has its own conveniently located test unit, uses it regularly.

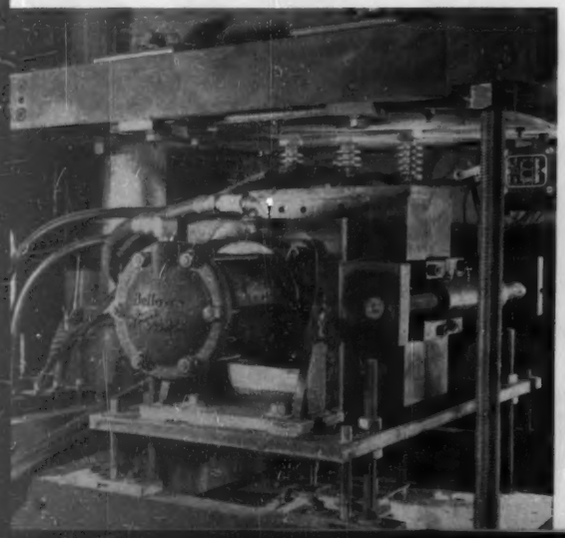
Simultaneous tests can be made with multiple equipment set up in laboratory.

TEAM SHELL and PERMANENT MOLDS To Recover Scrap Nickel Anodes

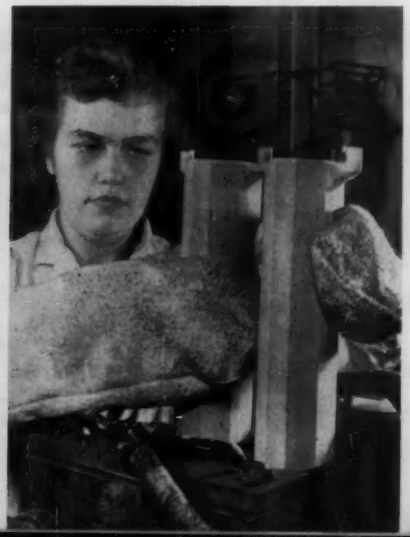
1 Shells for lining permanent molds for casting nickel plating anodes at Univertical Foundry & Machine Co., Detroit, begin with additions of 3½ lb resin per 100 lb sand. After 15 sec mixing, 12 oz alcohol is added and mixing resumed.

2 Key to the liner operation is this machine capable of blowing shell molds and cores, separately or simultaneously. Newer, 2-station machine makes shells on 8-sec cycle, at 240/hr in multiple cavity boxes.

3 Resin-coated sand is blown into the space between the steel mandrel and the closed core box which are at 475-500 F. Curing starts immediately; shell is ready for use in 20 sec.



4 Skill required for operating the blower is limited to pressing buttons starting automatic cycle and removal of cured shell.



5 Old, worn-out permanent molds, salvaged for back-up use by machining to the exterior tile-shape of the shell liner, now have practically unlimited life. Funds slated for new permanent molds set up the shell mold operation.

6 Assembly of dove-tailed shell segments and separately blown bottom piece eliminates previous iron pick-up from the mold.

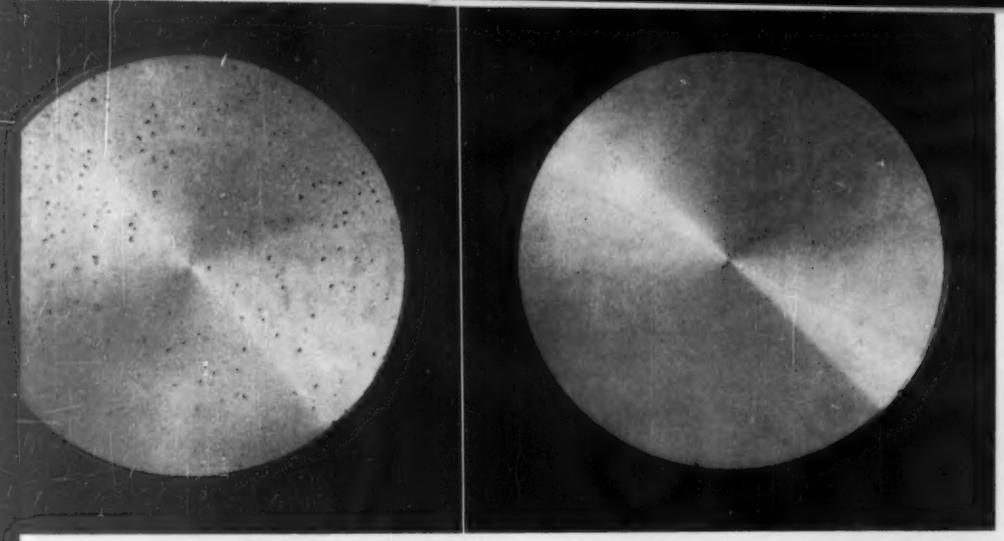
7 Back-up molds are bottom-hinged to permit opening for stacking 7 to 9 shells and for removal of anode and shell after pouring

8 Preheated pouring cups are placed on lined molds locked in a closed position for pouring, then removed in 5-10 min.

9 Scrap anode spears and butts are melted and cast at 2975-3000 F into 1½" x 3" ovals, in lengths to 90", weighing 1 lb/in. After tumbling, anodes are cut to length, then drilled and tapped at one end for plating tank hanging hooks.

10 At present, Univertical is not blowing shells for other applications; however, they contemplate changing their other permanent mold operations to shell liners when present molds become obsolete.

PHOTOGRAPHS AND INFORMATION FOR THIS ARTICLE WERE SUPPLIED THROUGH THE COOPERATION OF THE BARRETT DIVISION OF ALLIED CHEMICAL & DYE CORP. AND C & S PRODUCTS CO., INC.



JACK MORGAN / *Engineer*
Foundry Services (Canada) Ltd.
Guelph, Ontario

Here's how to keep away from gas and non-metallic inclusions

Gassy aluminum alloy (left) and sound metal from same melt after chlorinated hydrocarbon treatment. Reaction also helps reduce Al_2O_3 inclusions.

You Can Make Clean, Sound ALUMINUM ALLOY CASTINGS

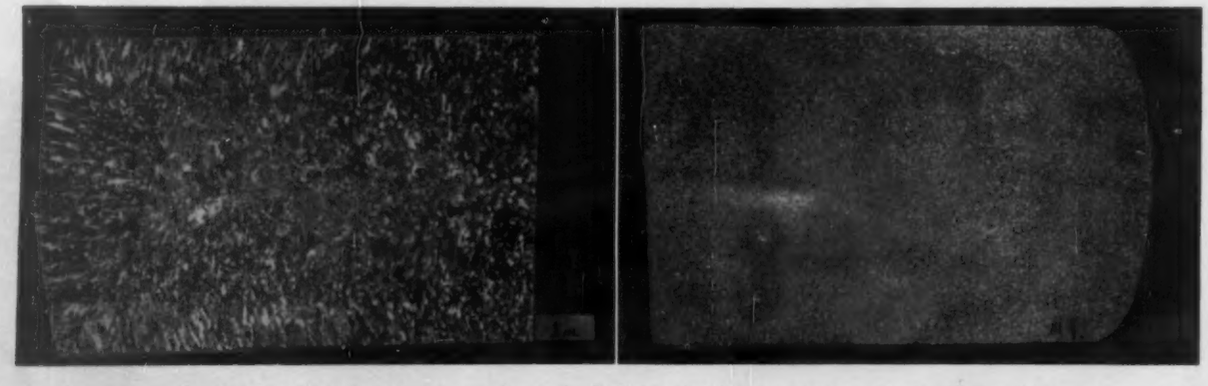
■ Most defects in aluminum alloy castings which can be traced to faulty melting technique are due to gas porosity or non-metallic inclusions. Gas porosity is usually visible on machined or polished surfaces as minute cavities, generally spherical in shape and about the size of a pin—hence the term "pinhole porosity." Non-metallic inclusions occur as rough flakes and usually consist of the oxides of aluminum or magnesium.

It is virtually impossible for the naked eye, and difficult even with the aid of a microscope and polished microspecimen, to distinguish between gas occlusions, solid inclusions of oxides, and the cavities which are due to shrinkage. The distinction can be aided, however, by assessing the distribution of the defect and also its form and size. Solid inclusions such as aluminum oxides will tend to have serrated or jagged edges and be distributed at random. Gas occlusions will be concentrated at the grain boundaries, tend to be spherical, and show, in any particular specimen, a marked limitation of size variation. Dependent a little on the section involved, there will be little or no variation in the size of holes due to occluded gas, whereas cavities due to "included" gas (turbulence) can vary considerably in size.

The fact that shrinkage cavities also occur around grain boundaries does complicate matters, but examination of the casting and its risers will assist in making a ready distinction between gas porosity and shrinkage cavities. Castings suffering shrinkage have local "frosted" looking areas and probable hairline cracks especially at sectional changes, while risers of castings containing gas will be flat topped and show much less depression or "pipe" than is normal.

In much the same way as bronzes and other copperbase alloys absorb hydrogen and carbon monoxide, aluminum alloys in the molten state are capable of readily absorbing hydrogen. The main source of contamination is from water vapor which is present as one of the products of the combustion of furnace fuels and as moisture in the air. The means of entry may be obvious in reverbatory melting, but it is also true that contamination can occur through the walls of silicon carbide or graphite crucibles even though the products of combustion are kept from the melt surface.

After a casting has been poured, the metal is unable to hold all the hydrogen in solution as it chills to the point of solidification. At this stage of the cooling process, the hydrogen which is expelled from soultion forms minute bubbles at the rain boundaries. The metal freezes around them, producing the cavities generally known as pinhole porosity. The degree of susceptibility to pinholing varies according to the alloy; it has been said that the wider the range of solidification the more tendency to gas porosity, but this increase in porosity where the



Coarse-grained, normal structure of pure aluminum (left) is refined by treatment with titanium and boron compounds.

freezing range is long is generally accepted to be due to shrinkage.

To minimize hydrogen absorption, control should be exercised to avoid excessive temperatures during the melting cycle—the higher the temperature the more hydrogen can be absorbed by the metal. Care should also be taken to insure that the burners of gas or oil-fired furnaces are functioning properly, that all tools are dry, that the metal charge is clean and free from corrosion products which can retain water vapor and, finally, that all fluxes are dry. By these good housekeeping measures, gas absorption can be reduced. But to insure gas-free castings, some degassing is desirable and often essential.

Aluminum alloys have such an affinity for oxygen that hydrogen cannot be removed by oxidation processes as is the case with copper alloys. If, during melting the latter, an excess of oxygen is present, carbon monoxide which is highly soluble in bronze is changed to carbon dioxide which is insoluble and cannot therefore be occluded. Similar considerations apply to the hydrogen which is present, but the case is not so simple.

The established methods for removing gas from aluminum alloys rely chiefly on the diffusion of hydrogen into an inert atmosphere. By passing a stream of inert gas through the molten metal (the gas being virtually insoluble in the alloy), hydrogen tends to diffuse into the bubbles of the inert gas and set up its equilibrium partial pressure. If the scavenging gas is broken up into a great number of very small bubbles, the area of the metal in contact with the scavenger is increased and the opportunity for hydrogen to diffuse is enlarged.

As the gas content is lowered, the partial pressure of hydrogen in equilibrium is lowered also and, as time goes on, each bubble of scavenger removes less and less hydrogen from the metal. This explains why at first it is easy to remove a lot of gas from aluminum alloys but difficult to get rid of the last traces. The partial pressure theory also explains why degassing treatments are more efficient at low temperatures—the partial pressure of the hydrogen is higher and each bubble of scavenger can remove a relatively large amount of hydrogen.

The older scavenging gases—nitrogen and chlorine—have in recent years been largely replaced by fully chlorinated hydrocarbons, notably hexachlorethane, which can be conveniently applied in the form of a tablet plunged to the bottom of the melt. At high temperatures this chemical decomposes to yield chlorine and other volatile chlorides which bubble through the metal as scavenging gases. Chlorine, whether introduced as a gas or indirectly as a tablet of the hydrocarbon, has one great advantage over nitrogen as a scavenging medium in that it fluxes films of aluminum oxide which hinder the escape of hydrogen into the scavenging bubbles. This reaction also helps reduce the formation of aluminum oxide inclusions in the metal.

Owing to toxicity and hazards of using pure chlorine gas, this process presents problems. Nitrogen is often employed, but as it must first be dried, complications of plant are involved. The use of chlorinated hydrocarbon tablets involves no complicated apparatus.

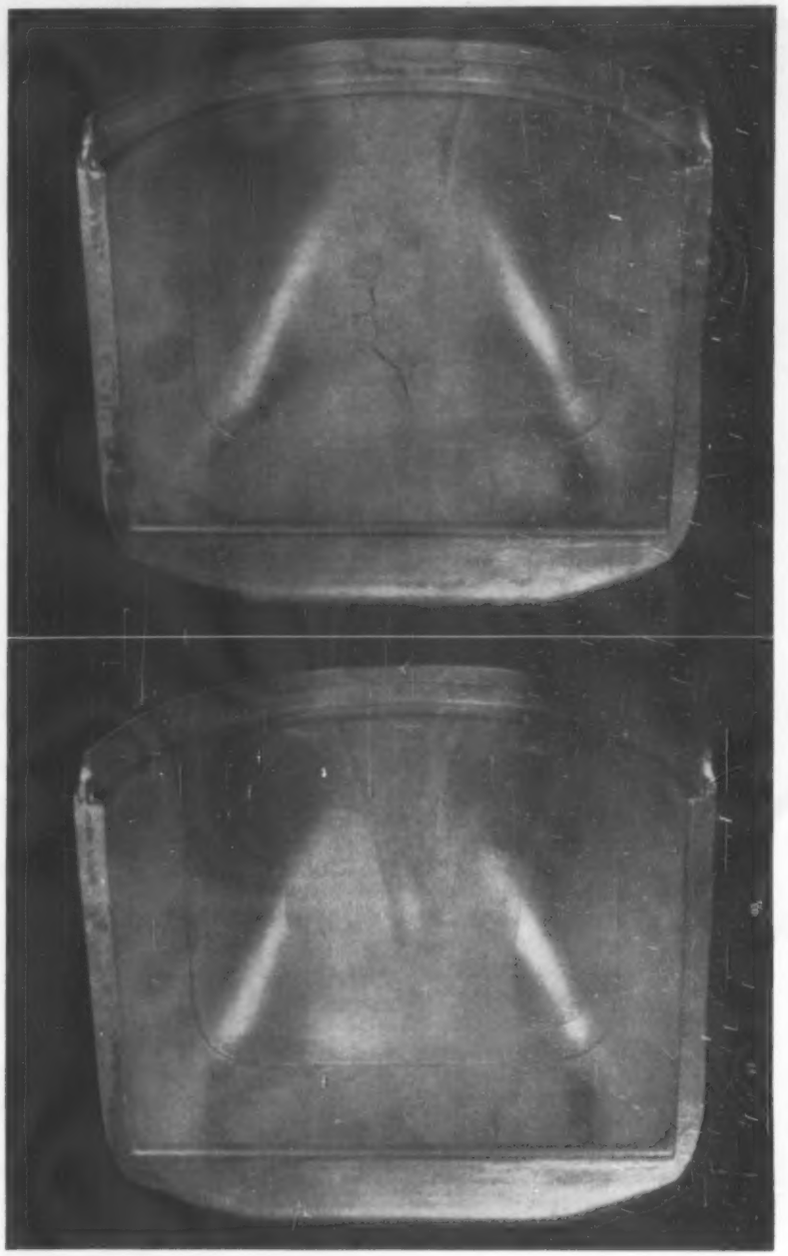
There is no direct evidence that any of these scavenging gases react chemically with hydrogen during the degassing process and, as most of the nascent chlorine liberated from the chlorinated hydrocarbons reacts to form aluminum chloride, this degassing process is not toxic. One difficulty with chlorine gas is control of the flow so that distribution shall be effective, without blowing large bubbles of useless volume through the melt. Incidentally, any really effective degassing with nitrogen is a tedious process involving periods of up to three-quarters of an hour for relatively small melts.

Control of Grain Size

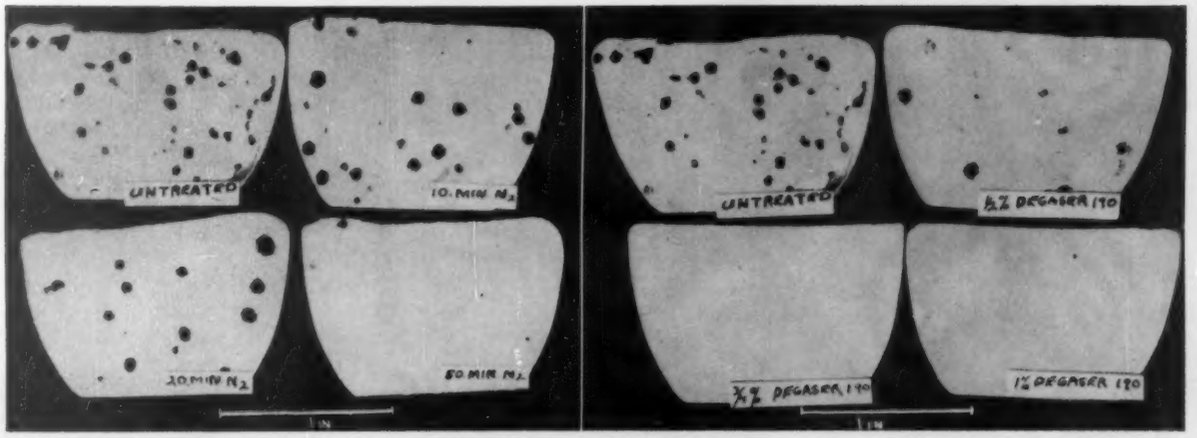
It is sometimes necessary to refine the grain structure of castings. The coarse grain of cast aluminum is generally typified by a large columnar structure, particularly at the outside edges of the castings. This can, adversely affect the physical properties. It is also true that this coarse-grained structure can have a profound influence on heat treatment processes and can, sometimes, seriously impair the results of rolling, drawing and extruding aluminum alloys.

With regard to heat treatment, particularly solution treatment, it is obvious that the distribution of the soluble metallic compounds around fine grain gives much more surface area between grains for the action to take place than if they were distributed around large grains. In some cases it has been possible to halve the time necessary for satisfactory solution treatment when melts have been subjected to grain refining treatments. In the continuous casting process for the production of ingot, it is possible to cast even the "strong" alloys at high speeds which would normally cause coarse grain and lead to breakup of the ingots on subsequent working. The refinement of coarse grain is, therefore, an extremely vital and interesting study.

Small quantities of boron and titanium are very effective in refining the grain structure of aluminum alloys. It is generally conceded that these two elements form nuclei of



Tear in permanent mold casting is removed by control hydrogen gassing.



Ingot cross-sections show ¾% degasser containing hexachlorethane is more effective than 50 min nitrogen.

titanium boride upon which crystal colonies tend to form in an early stage at a very rapid rate, resulting in fine grain size. Some authorities hold that it is necessary for minute amounts of carbon to be present. In combination with degassing agents, compounds of titanium and boron can be applied to the metal in convenient tablet form. At high temperatures the compounds break down to yield boron and titanium which unite to form titanium boride nuclei around which crystallization occurs.

Control of Oxidation

As well as increasing the possibility of gas absorption, high temperatures also increase the susceptibility of oxide formation which will aggravate conditions of gas retention and be revealed as inclusions in the castings.

In order to combat these deleterious effects, it is usually necessary to employ a flux as a surface protective cover. It is essential that it should fuse at a lower melting point than the alloy and should perform the multi-purpose of chemically reducing oxide, absorbing both calcined oxides and the products of reduction, and providing a protective cover to exclude furnace gases (or rather maintaining a low surface tension on the face of the melt, thus allowing excessive gases to escape).

Fluxes must in most cases perform other special functions which vary according to the alloy treated and the type of melting process. For instance, in comparatively small melts it is usual to use a flux which will form a dry, metal-free dross. This can be achieved by incorporating ingredients which react exothermically in contact with the surface of the molten metal. The additional heat prevents the solidification of metal globules in the dross and in their renewed molten state they run back into the main melt. The advantages of this become obvious when it is realized that normal untreated skimmings for a melt of aluminum contain up to 90 per cent of usable metal.

In refineries where dirty and/or finely divided scrap may be used, metal losses can be heavy and a substantial layer of liquid flux is used in order to douse the charge before ignition can occur. For best results the flux should be so composed that it does not thicken and lose too much of its efficiency as impurities are absorbed. An interesting sidelight has been the use of briquetted swarf with the briquet containing the necessary flux.

Consider the treatment of aluminum-magnesium alloys. When these alloys contain over 2 per cent magnesium, it is necessary to provide against the formation of magnesium oxide, which will usually form in preference and in addition to aluminum oxide. The presence of magnesium oxide in a casting is usually characterized by excessive discoloration and porosity. (The discoloration is due to the fact that a solution of magnesium oxide in either magnesium or aluminum is black) Therefore special chemicals have to be incorporated in the flux mixture to deal with the magnesium oxide.

These chemicals are unfortunately of a hygroscopic nature. To minimize the effect of water absorption during storage and use, these fluxes are generally pre-fused and stored in sealed drums. By carefully selecting the correct ingredients, it is possible to produce fluxes designed to melt at the correct temperature for different alloys. Melting points between 725° F and 1382° F can be achieved. Other chemicals will determine the viscosity of the molten flux, and it is possible to control the specific gravity and the tendency of the flux mixture to sink in or float on the alloy.

Although sodium salts are often incorporated, there are some alloys in which it is believed that the presence of sodium causes excessive brittleness, especially after heat treatment. Therefore before melting an alloy with which he is unfamiliar, a foundryman is well advised to consult a reputable flux manufacturer to obtain a flux suitable for the alloy.

Control of Alloy Structure

Another specialized application for fluxes is controlling the structure of certain alloy constituents. The simplest case of this is the modifying of aluminum-silicon alloys. If melted and cast without special treatment, the higher silicon alloys of aluminum (those containing 8 to 14 per cent silicon) have poor mechanical properties, little ductility and, when fractured, reveal a coarse crystalline surface. The introduction of a very small amount of sodium effects a transformation. For example the tensile strength of sand cast 10-13 per cent silicon alloy is increased by over 50 per cent and the elongation by over 300 per cent. The fracture now has a fine, light, almost silky texture quite unlike the coarse grey of the untreated alloy. This process is known as modification.

The addition of sodium to the melt can be made by plunging a small lump of sodium to the base of the melt. Objections to this method are that sodium metal is a dangerous material to have about the foundry, and, as it must be stored under kerosene, gas can be introduced to the melt from the oil film.

The alternative method of modification is often called the "salts" treatment. In this case the sodium is applied in the form of a flux consisting of a mixture of sodium salts which will fuse on the surface of the metal. By agitating the melt, the salts react with the aluminum to release sodium which is well distributed through the metal. Thorough modification is effected without any hazards or danger of introducing gas into the melt.

Control of Alloy Purity

At times magnesium is present in an aluminum alloy as an impurity. Magnesium, being very reactive, can be attacked by oxidation or by treatment with reactive chemicals. The latter is preferred because metal losses are less than in the case of oxidation processes. Chlorine gas, a very effective remover of magnesium, forms magnesium chloride which is molten about 129° F and is removed into the slag. Owing to its toxic nature it is not always desirable to use this gas. Silicofluorides and borofluorides, when heated, also release gases which will react with magnesium, and another treatment suggests itself whereby the magnesium is replaced by other elements such as aluminum. If, for example, aluminum fluoride is brought into contact with metallic magnesium, magnesium fluoride and metallic aluminum are formed. All these reactions require much heat; magnesium removal is generally carried out at temperatures in excess of 1470 F.

This paper was first place winner in the 1955 Technical Papers Contest of the Ontario Chapter of the American Foundrymen's Society.

TOOLS for the FOUNDRY of TOMORROW

Equipment and supply firms set new high in first showing of tools for castings production at 1956 AFS Castings Congress and Show

A MODERN CASTINGS BONUS

Use the convenient postpaid cards on pages 21 and 22 to get more information on the newest tools used in the castings industry.

Green Sand Molding

Automatic molding unit Type C makes copes or drags independently but units can be synchronized to pace production speed of copes to drags. Similar to previous models but this year unit is not only all air-operated but is also air controlled instead of electrically controlled. Bulletin. *Wm. H. Nicholls Co., Inc.* **Circle No. 241, pages 21-22.**

Sand additive made of pulverized corn cobs called Esso-Flo improves blowability, collapsibility, reduces expansion defects, in both core and molding sands. Decreases hot strength at 1000 F, increases it moderately at 2000 F. Bulletin. S. *Obermayer Co.* **Circle No. 242, pages 21-22.**

Stationmaster is new two-station, indexing type, jolt-squeeze-strip molding machine which incorporates automatic flask charge and discharge. Catalog No. JS1-2-54. *Herman Pneumatic Machine Co.* **Circle No. 243 pages 21-22.**

Fan-S-Chills offer 75% more chilling surface with less weight due to "S" design and perforations. Come in light, medium, and heavy gages with copper, aluminum, or tin coating. Bulletin. *Fanner Mfg. Co.* **Circle No. 244, pages 21-22.**

Green sand mold and core wash can be sprayed, brushed, or swabbed, then ignited or torch dried. Pyrokoat-G is for gray iron and non-ferrous, Pyrokoat-S is for malleable and steel. Superkoat can be used as mold spray or can be applied to hot or green cores. All are mixed at foundry with alcohol (use water for Superkoat to be applied to green, dry, or hot cores). Bulletin. *Delta Oil Products Co.* **Circle No. 245, pages 21-22.**

Waterless binder called Petro Bond reduces venting and permeability requirements, makes possible precision casting with conventional foundry equipment according to exhibitor. Sand is re-usable and rebonds readily. Use Petro Bonded sand for facing or for entire mold. Bulletin. *Baroid Div., National Lead Co.* **Circle No. 246, pages 21-22.**

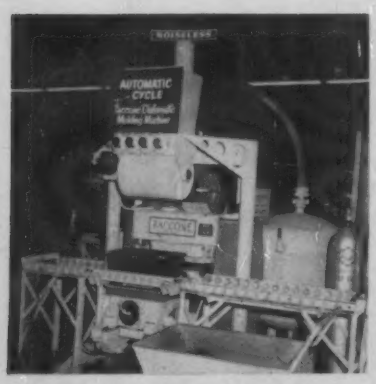
Automatic molding machine, No. 3602 Mol-Dex, enables semi-production foundry to take advantage of automatic equipment. Unit has cope and drag patterns alternately at four stations, uses blow-squeeze principle. Pre-form cavity for blowing eliminates need for special flask equipment. Gives 150-180 complete molds per hour. Bulletin. *Osborn Mfg. Co.* **Circle No. 247, pages 21-22.**

Cups for slingers are made of alloy tool steel to resist wear, reduce downtime and maintenance costs. Sling-Mor cups outwear standard cups 10 to 1, are stocked in 4-in. and 5-in. widths in all popular head sizes. *Latrobe Steel Co., Special Products Div.* **Circle No. 248, pages 21-22.**

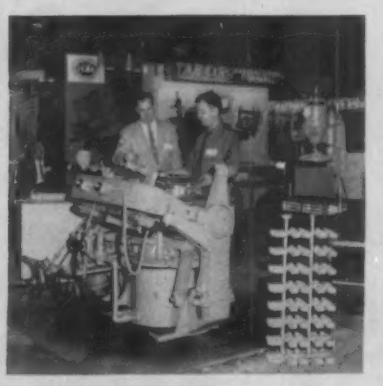
Monarch Kwikstrip mechanical corner flask is available in cast aluminum or cast magnesium. Steel wear strips on top and bottom are standard, at parting line optional. Accessories for this line of quick-release flasks include cast aluminum or magnesium upsets and cast aluminum or cast iron jackets. *Newaygo Engineering Co.* **Circle No. 249, pages 21-22.**

Mold blower by San-Blo has three-station turntable to move flasks in and out of machine and automatic stacking unit to pick off blown molds and close them. Also works for conventional cope and drag molding. No separate flask filling operation or need for spill sand conveyor. Bulletin. *San-Blo Div., Federal Foundry Supply Co.* **Circle No. 250, pages 21-22.**

Chill nails in Fuset line have channel design for more chill area, easier fusion, greater gripping power. Wide range of sizes. Line includes

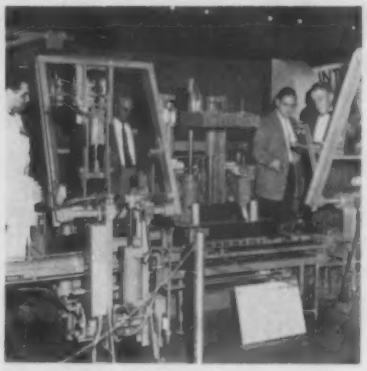


Diaform, newest in 80 years.



Tabor Model 720 for stack molds.

San-Blo blows, assembles molds.



International's molding combine.

Newaygo's rotary plate feeder.

Herman Stationmaster, automatic.

Fusert and Fuspider chills. Bulletin. *Canton Chaplet & Chill Div., W. L. Jenkins Co.* **Circle No. 251, pages 21-22.**

Wopper Jaw Jackets come in five styles, each adjustable to fit four different molds. Sides will lie flat when jacket is disassembled to make straightening easy. No projections at corners to catch metal. Bulletin. *Products Engineering Co.* **Circle No. 252, pages 21-22.**

Flasks and accessories for high production operations lead line that includes core locating and setting fixtures, automation equipment, transfer devices, and special handling fixtures. Bulletin. *Foundry Flask & Equipment Co.* **Circle No. 253, pages 21-22.**

Molding combination of International's Type AN turnover machine with two JJR double jolt machines (one for cope, one for drag), some roller conveyor, and a hoist or two gives you a practical push-button set-up for short runs or high production with all movements automatic and cycle controlled. Capacities, 750 to 10,000 lb. Bulletins. *International Molding Machine Co.* **Circle No. 254, pages 21-22.**

Easy-Off quick-release mechanism on line of flasks has been improved to give stronger corner construction, reduced wear, lighter weight. Sizes run from 10 x 10″ to 40 x 60″. *Adams Co.* **Circle No. 255, pages 21-22.**

Wooden core prints of standard strainer cores which can be attached easily to patterns are offered free by *Louthan Mfg. Co.* For information on how to obtain free core prints and matching strainer cores, **Circle No. 256 Pages 21-22.**

King-Size scab nails cover four times the area of usual foundry nails, require ¼ of time to set. Available in 1″ round or square head, ⅞″ to 2½″ long, coppered or tinned. Bulletin. *Fanner Mfg. Co.* **Circle No. 257, pages 21-22.**

Cope and drag automatic indexing unit is mounted on a circular conveyor with six stations at 60-deg intervals. Complete operation consists of pattern change station, flask placement station, jolt station, strike-off station, hydraulic squeeze and a draw station. *Davenport Machine & Foundry Co.* **Circle No. 258, pages 21-22.**

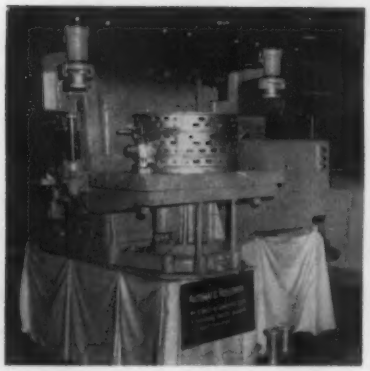
Mold Lite S is new mold spray. Manufacturer claims it reduces mold drying time, eliminates surface sand defects and reduces cleaning time. Will not wet back. *Thiem Products, Inc.* **Circle No. 259, pages 21-22.**

Taccone Diaform Molding Machine is called "first completely new method of green sand molding in 80 years." Machine used diaphragm method of molding, providing squeeze pressure claimed two to 10 times that used by previous molding practice and eliminating need for jolting. Manufacturer says maintenance of equipment and patterns is reduced and noise is virtually eliminated. Diaphragm "contours" around pattern, eliminating need for peen blocks, tucking, or hand work. *Eastern Clay Products Dept., International Minerals & Chemical Corp.* **Circle No. 260, pages 21-22.**

Pop-off flask has new mechanism whereby one operation will open cope and drag and any upsets attached. Device speeds production, gives longer life to the mechanism, manufacturer claims. *Hines Flask Co.* **Circle No. 261, pages 21-22.**

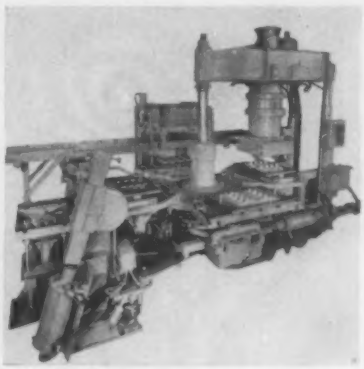
Electronic automatic jolt rollover gives increased number of molds per hour, reduces manhours. Time required to change patterns is reduced, rollover is positive in both directions, time cycle of molding is reduced because operator can be placing next flask while machine is running automatically. *Davenport Machine & Foundry Co.* **Circle No. 262, pages 21-22.**

Straight-wall "Hinge-Off flask is made of light metal, has pins and guides and pin center alignment. Positive fast-acting locking mechanism aligns open end rigidly. There is only one adjustment — tightening nuts on locking mechanism. Lengths and widths 10 in. to 20 in. in even inches; cope and drag



Davenport automatic jolt-roll.

Wopper jaw jackets, adjustable.



Osborn Mol-Dex, 180 molds/hr.

depths 3 in. to 5½ in. in half-inches. Flasks are used in new stack or multiple molding method. *Hines Flask Co.* **Circle No. 263, pages 21-22.**

EX-Dry is new burn-off mold spray with long burning and deep dry characteristics. *Hill & Griffith Co.* **Circle No. 264, pages 21-22.**

Kope Bead is trade name of new seal for the joints of molds and cores. *George F. Pettinos, Inc.* **Circle No. 265, pages 21-22.**

Multiple molding machine for stack molding is oil controlled, power operated, yoke type jolt-squeeze unit designed for pattern plates and flasks 12-14 in. wide, not exceeding 20 in. in length. Model 720 molding machine and other new units feature special flecked paint job. Photo to sheet 1-6-56. *Tabor Mfg. Co., Div. of Turbo Machine Co.* **Circle No. 266, pages 21-22.**

Large spider chills have recently been added to long line of standard and custom made chill nails. Bulletin. *Standard Horse Nail Corp.* **Circle No. 267, pages 21-22.**

Sand Conditioning, Handling, Reclamation

Pneumatic sand reclamation unit based on impact principle now has larger blast tube making unit less sensitive to moisture in return sand. Classifier chute at outlet gives additional dedusting. Vertical hangers of blast tubes have been changed for easier rotation and adjustment of tubes. Bulletin. *National Engineering Co.* **Circle No. 268, pages 21-22.**

Automatic sand tempering unit has moisture and temperature sensing devices in shell or base of mixer. Adds water automatically to reach preselected value plus enough additional to allow for evaporation. Known as No. 3907 End Point Automatic Sand Tempering Unit. Does not require constant batch size or water measuring tank. Bulletin. *Harry W. Dietert Co.* **Circle No. 269, pages 21-22.**

Rotary plate feeder for core blowers, mold blowers, and shell machines supplies sand accurately and uniformly from zero to 12 tons per hour. Readily adapted to existing installations at minimum cost. *Newaygo Engineering Co.* **Circle No. 270, pages 21-22.**

Series XI Hygro-Guide controls sand moisture through probe in mixer while sand is being mixed. Water added in three stages to reach desired level, all during normal mulling cycle. Use with any batch type mixer. Bulletin. *Haylco Controls Corp.* **Circle No. 271.**

Air-Reclaim makes sand like new.

End Point tempers sand on nose.

Whirl-Air-Flow pneumatic conveyors transport foundry sand mixtures and raw and return sand through overhead pipe line, eliminate truck travel, keep molders and coremakers supplied with fresh, aerated sand. Initial cost normally 50 to 60% of elevators and belts, maintenance usually less. Automatic transfer switches offer unlimited take-off points. All push-button controlled. Buletins. *Whirl-Air-Flow Corp.* **Circle No. 272, pages 21-22.**

Moist Recorder provides running record of moisture fluctuations in sand on conveyor belt, in bin or hopper. Continuous record of moisture can be correlated with casting quality. Unit can be equipped with warning device which signals when moisture is too high or too low. Bulletin. *Harry W. Dietert Co.* **Circle No. 273, pages 21-22.**

V & S Rapid Mixer for core sands comes in five models, all with reverse-S rotating blade reported to knead sand well, covering every grain with uniform coating of bond. Output ranges from 550 to 6600 lb per hr depending on model and local working conditions. Bulletin. *Carver Foundry Products Co.* **Circle No. 274, pages 21-22.**

Sand reclamation by centrifugal attrition is feature of Air-Reclaim dry sand system. Horizontal flow means equipment has low head room requirement, simplified maintenance gives 5-minute tube changeover. Attrition rather than impact results in minimum grain breakage. Bulletin. *Hydro-Blast Corp.* **Circle No. 275, pages 21-22.**

Pneumatic conveying equipment available in portable or stationary units transports sand, coal dust, soda ash, even metals. Available in capacities up to 5 tons per hour. Consists of vacuum producer, separators, vacuum lines, suitable tools for picking up the material. No dust hazard. Bulletin 143. *Spencer Turbine Co.* **Circle No. 276, pages 21-22.**

Vibrating feeder for sand can also be used for light shakeout work. Has variable control, operates on natural-frequency principle. *Carrier Conveyor Corp.* **Circle No. 277, pages 21-22.**

Sand muller, No. 2½F Simpson Mix-Muller, is new in manufacturer's line. 90-in. pan diameter has capacity of 3000 lb or 45 cu ft of material per batch. Liquid additions made through perforated spray pipe. Has centralized lubrication, is powered by 60 hp motor. *National Engineering Co.* **Circle No. 278, pages 21-22.**

Plasti-bond is new additive originally developed for high pressure molding but useful in other molding applications. Manufacturer claims improved finish, improved precision or weight control, faster cleaning, high flowability. *Eastern Clay Products Dept., International Minerals & Chemical Corp.* **Circle No. 279, pages 21-22.**

Molder's Helper combines Eleveyor, aeratôr, and single or double overhead sand bins to deliver prepared sand from muller in less than 30 seconds. Low cost, completely integrated, sand handling system can be used with existing mixing equipment, enables one operator to handle sand for four molding stations. Bulletin. *National Engineering Co.* **Circle No. 280, pages 21-22.**

Carbonite series of new sand additives have been designed for specific applications by *Hill & Griffith Co.* **Circle No. 281, pages 21-22.**

Model S-724-11M Royer Scrap Control mechanizes casting removal and sand cleaning in single operation. Loaded by front-end loader, the machine breaks up the sand and conveys the castings, gates, and risers off the end to the sorting table or conveyor. Magnetically cleaned sand is discharged at the opposite end of machine at rate of one ton per minute. *Royer Foundry & Machine Co.* **Circle No. 282, pages 21-22.**

Celex is new hardwood flour available in several grades for foundry use. *Hill & Griffith Co.* **Circle No. 283, pages 21-22.**

Moulders' Friend improved model includes variable speed unit, increased spread at the throat and heavier crank bar. New model is 10 in. wider, has heavier construction and new-type brushes. New design includes bucket that can be

Hygro-Guide controls moisture.

Moulders' Friend also transports.

Whirl-Air-Flow conveys by air.

lowered, filled with the brush, then raised and moved about the shop. *Moulders' Friend.* **Circle No. 284, pages 21-22.**

Nu-Bond Pitch is development which manufacturer claims gives superior bond for cores and molds, with uniform action and greater thermal stability. *Penn-Rilton Company* **Circle No. 285, pages 21-22.**

Sanitrol and Seaflour are trade names for new patented products designed to replace seacoal and wood flour in foundry operations. *George F. Pettinos, Inc.* **Circle No. 286, pages 21-22.**

Moisture controlled sand produced in a new plant by a rotary drum kiln dryer has moisture removed to 4 per cent to 7 per cent. The control prevents segregation, and insures uniform moisture content according to *New Jersey Silica Sand Co.* **Circle No. 287, pages 21-22.**

Coremaking

Lin-O-Set is cold setting bond.

Demmler's CO_2 gassing fixture.

Wolverine has new CO_2 binder.

New cold setting core binder, Lin-O-Set, saves up to 50 percent in labor on production of medium and large cores. Fewer rods required, faster shakeout, less gas during pouring and solidification of metal. Buletin 400. *Archer-Daniels-Midland Co., Foundry Products Div.* **Circle No. 288, pages 21-22.**

Ignitable spray coating IgniCO_2at does not soften CO_2 process molds or cores. Mixed with isopropyl alcohol, the spray coating burns off in 10 to 30 seconds, eliminating oven drying or torching. *Frederic B. Stevens, Inc.* **Circle No. 289, pages 21-22.**

DonCO_2 binder and sand for the carbon dioxide process provide maximum density, minimum bond addition and maximum dimensional control according to the manufacturer. *Eastern Clay Products Dept., International Minerals & Chemical Corporation.* **Circle No. 290, pages 21-22.**

Core paste with improved overall characteristics is Griptite. Can be prepared as needed from powder by mixing with water. *Delta Oil Products Co.* **Circle No. 291, pages 21-22.**

Silicate-base sand binder, Moroc, for CO_2 process molds and cores has been developed by Diamond Alkali Co. Advantages reported: no separation in storage, low viscosity permitting easy mixing, good bench life, superior CO_2 reaction, good storage and collapsibility in finished cores. *Delhi Foundry Sand Co.* **Circle No. 292, pages 21-22.**

Dexocor is new type of core and facing sand binder reported to substantially reduce baking time and impart moisture resistance to cores. Can be used alone or in combination with other binders. Reduces gas formation, virtually eliminates veining. Bulletin 319-56. *Corn Products Sales Co.* **Circle No. 293, pages 21-22.**

Fastrbake core oils doubled production of transmission case cores in one shop. Reportedly reduce cleaning costs, cut core costs. Bulletin. *Magie Brothers, Inc.* **Circle No. 294, pages 21-22.**

Latest core oil produced by Dayton is called Cor-King. Contains synthetic esters made specifically to bake in half, sometimes a quarter of time formerly required. Some especially compounded modifications have been used in dielectric ovens. Bulletin. *Dayton Oil Co.* **Circle No. 295, pages 21-22.**

Replacement for pitch compound, Hi-Plas, is non-toxic thermoplastic resin for cores, dry sand molds, and addition to green sand mixtures. Features less fumes, easier shakeout, better finish. Bulletin. *S. Obermayer Co.* **Circle No. 296, pages 21-22.**

Zirconium washes for all metals poured above normal temperatures

have low rate of expansion, rapid heat conductivity, high fusion point. Apply to green or to baked cores. Z-Koat contains zirconium plus other high fusion refractories; ZZ-Koat is all zirconium. Bulletin. *Delta Oil Products Co.* **Circle No. 297, pages 21-22.**

Universal blowplate makes job change possible in 15 seconds. McKee gasket inserted between upper and lower plates permits sand to go through only selected blowtubes. Ideal for jobbing shops where minimum change-over time is important. Bulletin FP-855. *Dodge Steel Co.* **Circle No. 298, pages 21-22.**

Air-drying spray for green sand cores and molds, Top Bond, provides resin bonded surface which is firm and hard with clean sharp edges. Gives resistance to washing, reconditions overbaked cores, gives green cores the surface hardness of baked cores. Bulletin TB-1 *United Oil Mfg. Co.* **Circle No. 299, pages 21-22.**

Cold setting binder is combination of oils which harden under influence of oxygen releasing agent without heat. Kold-Set process uses dry, clay-free sand mixed in any standard mixer, eliminates ramming (tuck only), cuts rodding 50 to 60%, reduces baking time 40 to 50%. Bulletin. *G. E. Smith, Inc.* **Circle No. 300, pages 21-22.**

Pureco method of core and mold hardening uses carbon dioxide to eliminate need for baking ovens, to get high dimensional stability in cores, eliminate fumes in pouring, reduce rejects. *Pure Carbonic Co., Div. of Air Reduction Co., Inc.* **Circle No. 301, pages 21-22...**

Core box vent from France is made of brass, has cone-shaped holes with small diameter against core to avoid vent marks. *Martin Engineering Co.* **Circle No. 302, pages 21-22.**

Core oil called Penolyn 178 is new fast-baking oil reported to retain all good characteristics of conventional core oils while baking as fast as phenol formaldehyde resin binders and retaining resistance to overbaking. Bulletin. *Penola Oil Co.* **Circle No. 303, pages 21-22.**

San-Blo Core Blower No. 155 is medium capacity blower that will handle up to 155 lb of light or heavy sand mix per blow. New stationary sand chamber is located directly under hopper. Has single push-button automatic controls. Bulletin E-21. *San-Blo Div., Federal Foundry Supply Co.* **Circle No. 304, pages 21-22.**

CO_2 process hardens cores in 20 seconds. Apply Red Diamond CO_2 any one of three ways using inexpensive equipment. Details in Bulletin 33A. *Liquid Carbonic Corp.* **Circle No. 305, pages 21-22.**

Cor-Blo is 2-station blow-dump type shell core blower that swings like pendulum between two boxes. It's the latest in line which includes Series 500 and Series 800 shell mold and core blowing machines which operate with two pattern carriages on horizontal track. Bulletin. *Harrison Machine Co.* **Circle No. 306, pages 21-22.**

W-602 is new binder for CO_2 process of hardening molds and cores. Sand has high flowability, is readily blown or rammed, sets rapidly and uniformly. Bulletin. *Wolverine Foundry Supply Co.* **Circle No. 307, pages 21-22.**

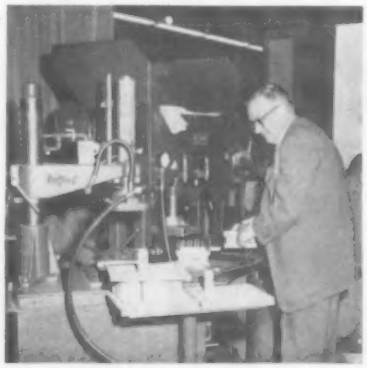
Superior Core Vent Wax is available in new hollow round and flat oval cross sections for applications, respectively, where excess wax is undesirable and for thin cores requiring vent of minimum cross section. Bulletin. *P.M.S. Co.* **Circle No. 308, pages 21-22.**

Core hardening stations for gassing cores with CO_2 come in Model H-1 for manual removal of cores, Model H-2 where mechanical stripping is required. Head is adjustable to maximum height of 15" in H-1, to 19" in H-2. Automatic air controls and timer are adjustable. Bulletin. *Redford Iron & Equipment Co.* **Circle No. 309, pages 21-22.**

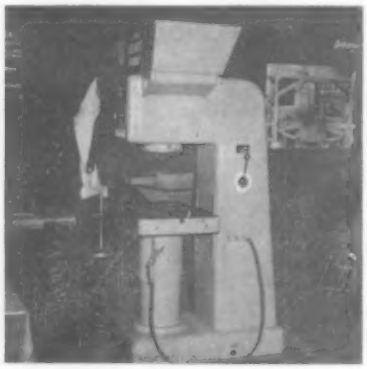
Corex 100 is modified urea formaldehyde liquid resin core binder that gives fast bake at low temperature, excellent collapsibility, high tensile strength. Makes cores for use with all alloys. Bulletin. *Jersey State Chemical Co.* **Circle No. 310, pages 21-22.**

Core vents with taper slot are self-cleaning, leave mark on core, are reinforced to prevent deformation. Manufactured by Krauss. Bulletin. *Carver Foundry Products Co.* **Circle No. 311, pages 21-22.**

Core washes that show sharp dip line on cores are Graph-Kote (graphite base) and Red-Skin (refractory mineral base). No "tears" or run downs to coat prints or other



Redford makes gassing station.



Hansberg, open season on cores.

Pureco CO_2 for cores and molds.

Red Diamond CO_2 works 3 ways.

Carver has core shooter too.

areas where wash is not wanted, less cleaning before core setting, better fitting assemblies, cleaner oven and conveyor racks. *Frederic B. Stevens, Inc.* **Circle No. 312, pages 21-22.**

Core shooter by V & S available in four types with five shooting heads for different core conformations. Air forces sand into box like a piston instead of carrying it in on air stream. Small amount of air used requires few vents for escape. Wear on core box minimized and wood boxes are readily blown. Bulletin. *Carver Foundry Products Co.* **Circle No. 313, pages 21-22.**

Pad to resist blow box wear comes in variety of sizes with pressure sensitive adhesive that makes application or replacement a matter of seconds without taking box out of production. Dike-O-Pad fits most complex box contour, resists core box cleaners, lasts thousands of blows. *Dike-O-Seal, Inc.* **Circle No. 314, pages 21-22.**

CO_2 core gassing machines custom built to gas cores blown in standard Demmler blowers. *Wm. Demmler & Bros.* **Circle No. 315, pages 21-22.**

Core binder Hy-Ten QS is cold setting material especially adapted to large jobbing work. *E. F. Houghton & Co.* **Circle No. 316, pages 21-22.**

Hansberg Shooter shoots rather than blows cores and molds. Sand is ejected suddenly from the chamber in a compact mass. The propelling air trapped within the machine when the mold or core cavity is filled "explodes" back through the sand in the chamber to aerate it for the next operation. Manufacturer claims shooting reduces venting, requires minimum air volume, permits use of exceptionally high, green strength sands. *Davenport Machine & Foundry Co.* **Circle No. 317, pages 21-22.**

CO_2 process equipment and supplies including binders, gassing apparatus, control valves all available through *Carver Foundry Products Co.* **Circle No. 318, pages 21-22.**

GE-13110 is new coating resin that can be blown without segregation and cured in a heated core box eliminating dryers and core ovens. Manufacturer claims better tolerance, smoother surfaces, higher strength and better resistance to thermal cracks. Larger cores can be made hollow. *General Electric Co.* **Circle No. 319, pages 21-22.**

CO_2 process binder EP-397 is improved binder which manufacturer claims incorporates the medium for collapsibility within the binder itself. *Foundry Services, Inc.* **Circle No. 320, pages 21-22.**

Metals, Fluxes, Refractories

Refractory gun for air placement of furnace linings is operated entirely by one man. All controls located at nozzle. Manufactured by Ridley & Co., Inc. Model R-1 has capacity of over a ton. Where ganister is used, all rebounded material may be recharged into gun without mixing or drying. Bulletin. *Pennsylvania Foundry Supply & Sand Co.* **Circle No. 321, pages 21-22.**

Refractory gun mix Goff Ammo is follow-up of company's Goff Gray hand patch material. Goff Ammo is carefully sized for best application and thorough coating with clay, has minimum fines and dust. Bulletin. *Daniel Goff Co., Inc., and Jesse T. Morie & Son, Inc.* **Circle No. 322.**

Crucible designed for attachable tongue and groove type lip has been perfected to give maximum life and minimum breakage. Bulletin. *National Crucible Co.* **Circle No. 323, pages 21-22.**

Refractory rammer line has been extended to include a heavy duty recoiless rammer for compacting ladle and furnace linings *Vibron Div., Burgess-Sturbentz Corp.* **Circle No. 324, pages 21-22.**

New refractories of this supplier include: 80 Alumina (contains 80% alumina) for highly basic slags at high temperatures and for extreme refractoriness such as malleable air furnace bottoms; Empire W, high duty fireclay brick; G-32, G-30, and G-28 insulating firebrick which extend the range of service up to 3200 F. Bulletin. *A. P. Green Fire Brick Co.* **Circle No. 325, pages 21-22.**

Cupola flux reported to give cleaner, hotter iron, lower cupola repair cost, is called Superflux. Has fluorspar base, comes in notched bricks for convenience in breaking to get desired size. Bulletin. *Superflux Mfg. Co.* **Circle No. 326, pages 21-22.**

Three refractory bricks for malleable air furnace use have high density, improved resistance to slag and metal attack, have longer service life. They are Ironton SD (super duty), Ironton Bung, and Ironton SW (side wall). Bulletin File D No. 5. *Ironton Fire Brick Co.* **Circle No. 327, pages 21-22.**

Slagtrap creates heavy cell-like slag in ladle which acts as insulator and strainer to hold down temperature loss, give cleaner metal and cleaner ladle walls; prevents sulphur from returning to iron after desulphurization. Bulletin. *G. E .Smith, Inc.* **Circle No. 328, pages 21-22.**

Interlocking lip tilting Carbond crucible gives high joint strength, no leakage, smooth pouring, longer service life. Can be installed rapidly. Bulletin Foundry 143. *Joseph Dixon Crucible Co.* **Circle No. 329, pages 21-22.**

Pneumatic refractory gun powered by gasoline or electricity applies up to 135 bags of cupola mix per hour. Unique feature of Jetliner is airlock which continuously and automatically feeds refractory material into air stream to give even distribution. Exhibitor claims unit will line faster than by any other method. Bulletin. *National Foundry Sand Co.* **Circle No. 330, pages 21-22.**

New refractories include Purocast-3000, a castable with low shrinkage and spalling giving superior performance at 3000 F. Also new is Helspot Brick, a graphite-base unburned brick available in standard 9-in. series shapes, cupola blocks, and tap-out blocks. Furn-A-Ram is a new hydraulic setting ramming refractory for aluminum melting furnaces. *Mexico Refractories Co.* **Circle No. 331, pages 21-22.**

Ferrocarbo is briquetted addition to cupola charge that manufacturer claims results in castings that are finer-grained, denser, stronger, easier to machine. *Electrominerals Div. of Carborundum Co.* **Circle No. 332, pages 21-22.**

Ridley is one-man lining gun.

Boron copper alloy containing 2% boron is used as densifier and deoxidizer for copper-base alloys. Bulletin. *Niagara Falls Smelting & Refining Div., Continental Copper & Steel Industries, Inc.* **Circle No. 333, pages 21-22.**

Aza is an aluminum-zinc-magnesium alloy for sand and permanent mold castings intended for pressure tightness, high yield and ductility. It has good shock and impact resistance, no warpage or distortion problems, good machinability and corrosion resistance, manufacturer claims. *American Alloys Corp.* **Circle No. 334, pages 21-22.**

Cupolinor 1500 is new refractory gun for longer-running and multiple installations. Most of former manual operations have been made automatic and operation is said to be simpler. New machine has larger feed wheel, dust-free gear reducer, stainless steel liners in both hoppers, improved nozzle. Auxiliary equipment includes right-angled nozzles, portable elevators and hoppers, water-pressure and mixing tanks. *Eastern Clay Products Dept., International Minerals & Chemical Corp.* **Circle No. 335, pages 21-22.**

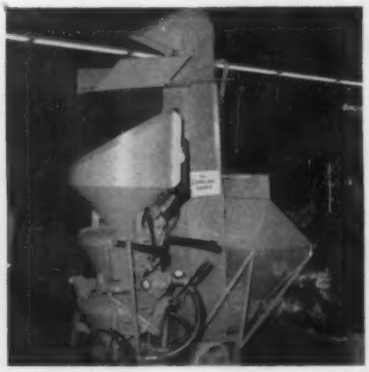
Improved Slagtite H.S. (high strength) is a refractory patching and lining compound with high strength and resistance to abrasion. Especially applicable for ladle linings and patching. *Laclede-Christy Co., Division of H. K. Porter Company, Inc.* **Circle No. 336, pages 21-22.**

Amalloy is a primary aluminum-magnesium-titanium casting alloy with stable as-cast physical properties, suitable for sand, permanent mold and die castings where strength and impact resistance are indicated. It has good dimensional stability, machinability, polishability and corrosion resistance, manufacturer claims. *American Alloys Corp.* **Circle No. 337, pages 21-22.**

Laclede Laclear is a new low duty fire brick made in Pennsylvania by the dry press process. *Laclede-Christy Company Div., H. K. Porter Company, Inc.* **Circle No. 338, pages 21-22.**

New 5 per cent titanium-aluminum alloy is used as a grain refiner. *Exomet, Incorporated.* **Circle No. 339, pages 21-22.**

Solid-nosed bonnet stopper head can be used without bolt, key or upsetting of rod if shoulder is currently used to carry weight of sleeves. Manufacturer claims a 50%



Cupoliner 1500, mostly automatic.

Kaiser periclase for furnaces.

saving in plug mix, added life to rod and less labor time to assemble. *American Refractories & Crucible Corp.* **Circle No. 340, pages 21-22.**

Kaosil is a new semi-silica brick of super duty quality and high refractoriness compared with conventional semi-silica. *Harbison-Walker Refractories Co.* **Circle No. 341, pages 21-22.**

Aluminum Exo-Gas is new aluminum de-gasser developed by *Exomet, Incorporated.* **Circle No. 342, pages 21-22.**

Two-piece ring lining for crucible furnaces is claimed to be easier to install. *American Refractories & Crucible Corp.* **Circle No. 343, pages 21-22.**

Harcor is a new ramming material of high alumina content. Claimed properties include exceptionally high strength, excellent volume stability and high refractoriness. *Harbinson-Walker Refractories Co.* **Circle No. 344, pages 21-22.**

New style carbide crucible with reinforced top has been developed to combat slag erosion. *American Refractories & Crucible Corp.* **Circle No. 345, pages 21-22.**

Carbon and graphite products for metal castings industry have been expanded to include cupola wells and nipples. *National Carbon Co., Div. of Union Carbide & Carbon Co.* **Circle No. 346, pages 21-22.**

Basic lining materials for high frequency induction furnaces are low porosity grains of high purity and very high refractoriness. Dense lining is possible through use of the newly developed basic cupola lining materials, 102 Periclase and 1020 Periclase Patching Material. Special Technical Bulletin. *Kaiser Chemicals Div., Kaiser Aluminum & Chemical Sales, Inc.* **Circle No. 347, pages 21-22.**

H-W C-Mix is a new high magnesia ramming material made from sea water and used in open hearth and electric furnaces. *Harbison-Walker Refractories Co.* **Circle No. 348, pages 21-22.**

Melting and Pouring

Hot blast cupola with new approach is the GHW which draws off gas below charge level, cleans it, burns it in recuperator, by-passes gas not used for heating blast to be used for core ovens or other plant use. New design reportedly cuts coke consumption up to 40%, increases melting capacity up to 40%, cuts silicon and manganese losses by 50%, cuts hot metal production cost up to 30%. Bulletin. *E. S. Harman Corp.* **Circle No. 349, pages 21-22.**

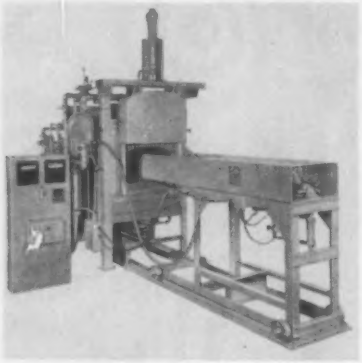
Aluminum melting furnace with automatic loading tray eliminates refractory damage due to throwing metal into furnace. Furnace is dry-hearth, non-tilting, with burners firing vertically from roof. Autoloader is air powered. *Eclipse Fuel Engineering Co.* **Circle No. 350, pages 21-22.**

Automatic ladling unit delivers metal from beneath surface of bath to die or permanent mold. Adaptable to electric furnaces or fuel-fired reverberatory furnaces. Normal range 1 to 10 lb aluminum, other sizes available. Size of shot accurately controlled within range of equipment. Bulletin 570. *Lindberg-Fisher Div., Lindberg Engineering Co.* **Circle No. 351, pages 21-22.**

Electric furnace trends include platform tilt, pin lock 4-point roof suspension, and cone drive winch for high speed electrode travel. *Lectromelt Furnace Co., Div. of McGraw Electric Co.* **Circle No. 352, pages 21-22.**

Electric resistance furnace with Corrtherm corrugated sheet heating element is for melting aluminum, magnesium, zinc, and lead. Practically indestructible, operates at low voltages which eliminate shock or short hazards. Bulletin 321. *Lindberg-Fisher Div., Lindberg Engineering Co.* **Circle No. 353, pages 21-22.**

Detroit Rocking Electric Furnace represents complete redesign of arc control in type LFNP, 150 KW, 500-lb capacity furnace. Magnetic amplifier type of control gives variable speed to control motor so that



Eclipse Autoloader fills furnace.

Corrtherm element, low voltage.

Detroit type LFNP holds 500 lb.

motor speed is directly proportioned to unbalance. Complete absence of moving parts, contactors, relays, etc., insures instantaneous motor action and minimum parts replacement. Rectifiers are provided. Electrodes are motor-driven under manual push button control for removal during operation, while left-hand electrode is also under automatic control. Features close control over electric power input during melting, compactness, quick withdrawal of electrodes for fast charging. New clamp design permits use of standard electrodes. *Detroit Electric Furnace Div. of Kuhlman Electric Co.* **Circle No. 354, pages 21-22.**

Feedex is a feeding and pipe eliminating compound which, mixed with water, can be molded to any shape. Usually used as hollow cylinder or sleeve aligned with the inside of feeding heads in sand and ingot molds, etc. Is ignited by molten metal entering the feeding head, generates heat, after which it forms an insulating refractory lining. Keeps metal in the feeding head liquid for longer periods than usual and thus helps continue the feeding action longer, manufacturer claims. Leaflet No. 51. *Foundry Services, Inc.* **Circle No. 355, pages 21-22.**

Electric resistance holding furnace is a newly completed development along with 65,000 lb-capacity reverberatory furnace for zinc and loaders for reverberatory furnaces. *Stroman Furnace & Eng. Div., Peterson Oven Co.* **Circle No. 356.**

Shakeout, Cleaning, Finishing

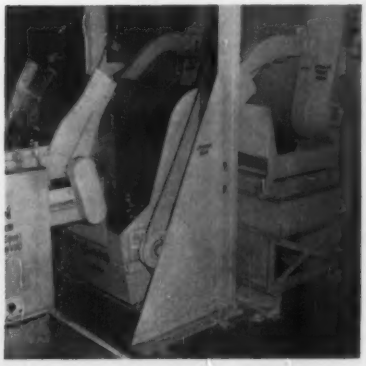
Super Tumblast with load capacity of 28 cu ft has been redesigned extensively to give maximum productivity and maintenance-free operation. New wheel throws 830 lb abrasive per minute (more than twice as much as any similarly sized wheel previously used). Cleaning is faster, more uniform. New wear resisting liners give 25 to 50 times normal life. Abrasive cleaner gives 300% greater separating efficiency. Machine is tighter to eliminate jamming and loss of abrasive. Lends itself to automated processing. Bulletin 125-D. *Wheelabrator Corp.* **Circle No. 357, pages 21-22.**

Tuf-Wear bolts combat abrasion while holding liners in shot blast machines. High alloy wafer on head practically eliminates wear. Slot in shank end instead of wafer extends life. Stock and special sizes. *Latrobe Steel Co., Special Products Div.* **Circle No. 358, pages 21-22.**

Automation of "Blastmaster Barrel" is new development. When loader is filled it automatically weighs proper load, stops conveyor feeding the loader, loads castings into

Super Tumblast twice as good.

Simplicity all-cast shakeout.



Blastmaster has been automated.

Carrier uses "natural frequency."

Fox grinders and cut-off wheels.

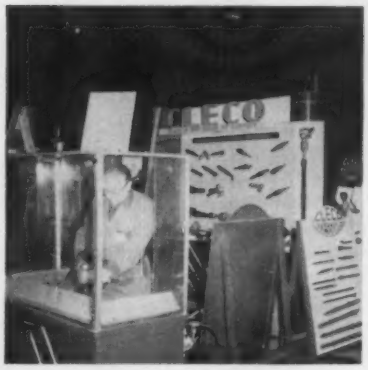
the barrel, goes through the blasting cycle, and automatically discharges the cleaned castings into another conveyor. *Pangborn Corp.* **Circle No. 359, pages 21-22.**

Super-Dense grinding wheels are for heavy metal removal in carbon and alloy steel foundries. Used for high head pressure grinding, remove metal rapidly and at low cost without excessive burning or heat checking. Bulletin GS-55. *Electro Refractories & Abrasives Corp.* **Circle No. 360, pages 21-22.**

Wire brush machines of Cleco Series 14 are especially designed to be light and maneuverable, to operate at slow speed. Available with straight or pistol grip handle and with snap throttle or quick-as-wink throttle. Bulletin WB-5-56. *Cleco Div., Reed Roller Bit Co.* **Circle No. 361, pages 21-22.**

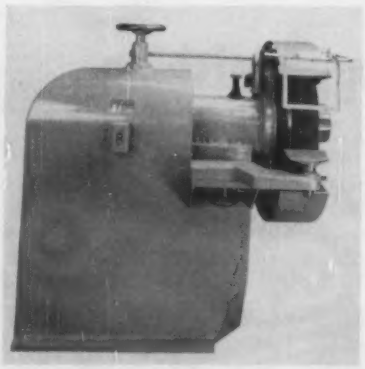
Swing frame grinder developments include Model 4C swing frame cut-off and Model 16 cup wheel swing frame grinder. Model 4C with 24" x 3/16" x 1-3/4" wheel driven by 25 hp motor is recommended for use with Meehanite or Ductile iron and for stainless steel. Model 16 has been developed for finish grinding. *Fox Grinders, Inc.* **Circle No. 362, pages 21-22.**

All-cast, one-piece gyrating shakeout made of nodular iron has reduced wear and maintenance, makes less noise. Bulletin. *Simplicity Engineering Co.* **Circle No. 363, pages 21-22.**



Cleco Model 2000 grinder hailed.

Vacu-Blast room, no pit needed.



U. S. Electrical, variable speed.

Royer scrap control, circle 282.

Welding electrode Inco-Rod A has been developed particularly for welding dissimilar alloy combinations involving ferritic stainless, austenitic stainless, low alloy steels, mild steels, and high-nickel alloys. Bulletin. *International Nickel Co., Inc.* **Circle No. 364, pages 21-22.**

Model 2000 grinder is reported by users to be well designed with good balance and weight, hard to stall, convenient because of three choices of location for dead handle, detachable live air handle. Four models take 6" cup wheels and 9" sanding pads or cutting wheels. Bulletin. *Cleco Div., Reed Roller Bit Co.* **Circle No. 365, pages 21-22.**

Shakeout capable of handling 16,000 lb load operates on only 2 hp

because it is constructed on natural-frequency principle. *Carrier Conveyor Corp.* **Circle No. 366, pages 21-22.**

Model 61VS single end variable speed snagging grinder is a variation of a double-end machine. Manufacturer claims it is specially adaptable to production line work, is a good stub user and has the added safety factor of not having the operator interference of double-end machines. Catalog No. 100. *United States Electrical Tool Co.* **Circle No. 367, pages 21-22.**

Arcair Model G-5 torch is designed especially for heavy duty electrodes up to and including 5/8 in. New control unit on torch controls air through unique vent design rather than through valve. *Arcair Co.* **Circle No. 368, pages 21-22.**

Grind Air-rester is new grinder and dust collector in a single unit. Steel wool filter pads trap dust and are replaceable. Clean-out dust drawer is removable. Fan can handle abrasive materials. *Foundry Grinder Division, Standard Electrical Tool Co.* **Circle No. 369, pages 21-22.**

Waffle-floor blast room has excellent visibility, simplified air system. Air comes in at top, goes straight down through floor, yet requires no pit. Blast room is large enough for protected workers to clean in, filters and collects its own dust. *Vacu-Blast Co., Inc.* **Circle No. 370, pages 21-22.**

Royalite grinding wheel is doubly reinforced to withstand stresses at the hub. In addition to steel safety ring, special strong abrasive mix is also used around hub. Bulletin. *United States Rubber, Mechanical Goods Div.* **Circle No. 371, pages 21-22.**

Improved steel shot and grit lasts longer, is tougher, makes better peening and cleaning medium than iron, says manufacturer. The shot and grit is hardened under controlled conditions and produced in an electric arc furnace. Available in 50 lb bags. *Cleveland Metal Abrasive Co.* **Circle No. 372.**

Infinitely variable speed snagging grinders feature dual protection plate steel wheel guards, which exceed standard safety code standards. Stationary guard is integral and encloses primary guard which is adjustable to wheel wear. Automatic mechanical safety interlock prevents overspeeding of grinding wheel. Speed can be changed with grinder running. *Foundry Grinder Division, Standard Electrical Tool Co.* **Circle No. 373, pages 21-22.**

Copper-clad electrodes for torches allegedly give superior performance. Available in sizes up to and include 3/4 in. *Arcair Co.* **Circle No. 374, pages 21-22.**

More metal comes off the work when a Thor 360 Cycle High Frequency Grinder is used than with any other type of portable grinder, according to the manufacturer of this new tool. Firm's complete line of portable power equipment includes a new 7½ lb pneumatic powered vertical grinder. *Thor Power Tool Co.* **Circle No. 388, pages 21-22.**

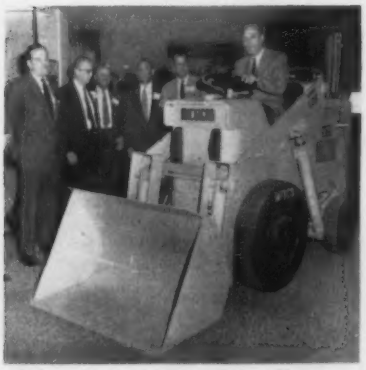
Materials Handling

Trackmobile is versatile tractor designed for hauling railroad cars on sidings or within the foundry itself. It can switch and spot as many as six loaded railroad cars at once, and can travel on track or on the ground. For traveling from job to job pneumatic wheels are automatically lowered and machine can be driven across the yard or unimproved track. For moving cars, road wheels retract and the Trackmobile travels sideways on rail wheels. Can also be used as a tractor for hauling carts and skids. *Whiting*

Trackmobile, on rails or ground.

Nomad has new pallet retriever.

Allis-Chalmers truck, box dumper.



Model 12B tractor shovel, Clark.

Payloader Model HAH by Hough.

Austin-Western truck crane.

Corp. **Circle No. 375, pages 21-22.**

Vibrating feeder is air powered, comes in variety of models with capacities from 0.1 to 28 tons per hour and feeding velocities of 0.05 to 1.2 feet per second. Can be pedestal mounted or hung. Bulletin 1000. *Cleveland Vibrator Co.* **Circle No. 376, pages 21-22.**

Universal mold conveyor is refined version of former conveyor with flexible contour operating on sealed ball-bearings and oil-impregnated bushings. *Jeffrey Manufacturing Co.* **Circle No. 377, pages 21-22.**

"Selectodyne" magnetic control device for overhead cranes permits sensitive hoisting or lowering of loads. Unit consists of dual master switch, hoist controller and eddy current brake. Operation is brought to a single control lever in operator's cab. Manufacturer claims easier, smoother, more precise hoisting or lowering of both heavy and light loads. *Whiting Corp.* **Circle No. 378, pages 21-22.**

Mitco Industrial Tire is a trouble-free laminated tire that replaces pneumatic tires on all types of material handling equipment. No work stoppages due to punctures or blow outs, traction superior to continuous tread tires, steering easier. Bulletin. *Mitchell Industrial Tire Co., Inc.* **Circle No. 379, pages 21-22.**

Michigan tractor shovel Model 12B has torque converter, 12 volt electrical system, short turning radius, low level bucket tip-back. Capacity is 15 cu ft. Available with gasoline or diesel power. Bulletin. *Clark Equipment Co., Construction Machinery Div.* **Circle No. 380, pages 21-22.**

Nomad has new pallet retrieving mechanism for long conveyor runs where slope on gravity return line requires too much head room. Ties in automatically with pallet raiser, mold dump, and Nomad track system. Bulletins. *Westover Corp., Nomad Equipment Div.* **Circle No. 381, pages 21-22.**

Allen shovel-fork for industrial fork trucks is shovel-like attachment that has shorter over-all length permitting shorter turning radius and greater dumping height. Permits straight-line loading and has positive dumping action for handling bulk materials or small castings. Sizes vary from 9 cu ft to 81 cu ft. Can change from fork to shovel in 2-1/2 min. *Allen Industrial Products, Inc.* **Circle No. 382, pages 21-22.**

Truck-mounted hydraulic crane has found expanded uses in the foundry industry in handling scrap and castings with a magnet, with a clamshell for handling coke and other bulk materials, and with a bucket. Crane has all-wheel drive and all-wheel steer, a continuous 360 deg swing. All boom movements and outrigger movements are hydraulic. *Austin-Western Works of Baldwin-Lima-Hamilton Corp.* **Circle No. 383, pages 21-22.**

Model HAH "Payloader" tractor-shovel has 40-deg. bucket breakout action at ground level, torque-converter drive, and a closed pressurized hydraulic system with built-in shock absorber. Has power steering with front wheel drive. Model HAH has 1 cu yd capacity; Model HO is similar but with 2-1/4 cu yd capacity and four-wheel drive. *Frank G. Hough Co.* **Circle No. 384, pages 21-22.**

"Shark Tooth" single-line hook-on bucket has teeth which "finger" their way through coke, sand and small limestone to permit handling with minimum degradation. Bucket has removable plate that takes fingers off to permit use on limestone, scrap and similar bulk materials. *Blaw-Knox Div. of Blaw-Knox Co.* **Circle No. 385, pages 21-22.**

Planobot machine is designed for automatically handling hot materials for specialized movements. At the Castings Congress, a Planobot served soft drinks automatically through the following cycle of operations: (1) a coke bottle slid out of cooler; (2) Planobot arm descended; (3) arm seized coke bottle; (4) arm transferred bottle to decapping station; (5) arm decapped bottle; (6) arm transferred bottle to pouring station; (7) arm tilted bottle, thus pouring it; (8) arm returned to original position; (9) arm released empty bottle; (10) repeat cycle. *Planet Corp.* **Circle No. 386, pages 21-22.**

Drop bottom box dumper permits transport and bottom unloading of tote boxes. For use with any fork lift truck, boxes can be stacked to 120 in. *Allis-Chalmers Mfg. Co.* **Circle No. 387, pages 21-22.**

Safety, Hygiene, Air Pollution Control

Dust separation by dry centrifugal principle is feature of AMERclone Type G tube which throws dust out tangentially. Nine tubes make up one cell. Collection efficiency is practically constant over wide range of exhaust volumes. Bulletin 291. Bulletin 292 tells how AMERclone is applied to cupola dust control. *American Air Filter Co., Inc.* **Circle No. 389, pages 21-22.**

Floor sweeper Model L by Tennant enables one man to clean 5000 sq ft per hour. Vacuum system puts dirt in hopper with capacity of 200 lb. Cleans 22-in. path in one pass. Bulletin 81.16. *G. H. Tennant Co.* **Circle No. 390, pages 21-22.**

Noise protection devices that protect against high-level industrial noises are Earsaver, cap with ear cushions for maximum protection; Noisefoe with ear cushions on spring-type head suspension; Ear Defenders, soft, rubber-like ear plugs (have convenient plastic carrying case). Bulletin 0903-1. *Mine Safety Appliances Co.* **Circle No. 391, pages 21-22.**

Dust collectors under name Multi-Wash, available in 18 models, have been redesigned to cover broader volume range and to give higher efficiency. Fan has been put on top instead of side on three models to reduce space requirements and initial installation costs. Bulletins. *Claude B. Schneible Co.* **Circle No. 392, pages 21-22.**

Minigards are light-weight inexpensive face shields for protection against light flying particles and nuisance glare on any job. Have stainless steel frame supports and clear or green acetate visor and sparkguard. Bulletin 0302-3A. *Mine Safety Appliances Co.* **Circle No. 393, pages 21-22.**

Vacu-Pinger wet dust collectors use a combination of vacuum and impingement principles to achieve high efficiency, manufacturer claims. Air is channeled through a maze until the dust is taken out by water and delivered dust-free. *Vacu-Blast Co., Inc.* **Circle No. 394, pages 21-22.**

Sound level meter and analyzer, Soundscope, combines functions of sound level meter, octave band analyzer, and narrow band analyzer in single compact unit with self-contained power supply and integral calibration (electrical and acoustical). Bulletin 0818-1. *Mine Safety Appliances Co.* **Circle No. 395, pages 21-22.**

Wet dust and fume collector uses six scrubbing stages with cyclonic action to pass air through water cascades. Dual stage moisture eliminator exhausts dry air, prevents stack corrosion and permits recirculation of air where toxics are not involved. *Zack Co.* **Circle No. 396, pages 21-22.**

Pangborn Ventrijet is new wet dust collector. Air enters through venturi tubes into chamber where there is

Tennant Model L floor sweeper.

Pangborn Ventrijet gets dust.

AMERclone Type G collector.

reduced pressure. Expansion of air causes loss of velocity, and heavier dust particles drop into water. Water meets high-velocity air stream, mixing dust particles in air stream with water particles. Sludge is washed into tank and settled to bottom for removal. Endless chain conveyor deposits sludge into receptacle for salvage or discard. *Pangborn Corp.* **Circle No. 397, pages 21-22.**

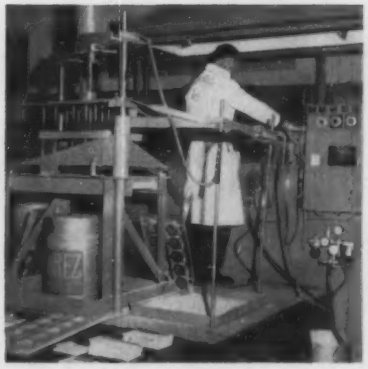
Resistabrade, lining for tumbling mills, rattling barrels and similar foundry duties has found a new application in noise reduction. Studies show substantial improvements in noise levels where the product is used. *A.I.C. Engineering Company.* **Circle No. 398, pages 21-22.**

Burn kit provides complete, fast, effective first aid treatment for burns. Includes aerosol spray type dispensers and sterile bandages in Type D packages. Kit has all-weather case construction. Bulletin 0402-3. *Mine Safety Appliances Co.* **Circle No. 399, pages 21-22.**

Sound-reducing panels for chipping rooms and other noisy areas in the foundry consist of a perforated screen with acoustical filler behind the screen. *A.I.C. Engineering Co.* **Circle No. 400, pages 21-22.**

Shell Molding and Coremaking

Link-Belt complete shell unit.



Shell-O-Matic, man, one button.

SPO is six-station shell setup.

Shell molding system consisting of four-station molding machine, core setting belt conveyor, closing machine, and trolley conveyor for finished shells produces up to 240 shells per hour. Unit is compact, automatic (operator can also run manually from control panel), takes four patterns up to 20 x 30". Bulletin 2462. *Link-Belt Co.* **Circle No. 401, pages 21-22.**

Admirez is new resin for shell molding which helps round out line of binders and additives produced by this company. Bulletin. *Archer-Daniels-Midland Co., Foundry Products Div.* **Circle No. 402, pages 21-22.**

"Blo-Core" shell machine automatically produces shell molds and cores separately or simultaneously. All air operations initiated by solenoid valves. Heater plate temperatures thermostatically controlled. Design eliminates drier plates and ovens. Hollow cores can be made. Two-station operation requires 36 sq ft of floor space, worked by one operator from a single position. Standard machine designed for core boxes or patterns up to 16 x 22 in. in size and up to 36 in. in height. Adaptable to either horizontal or vertical partings. Bulletin CS-15. *C & S Products Co., Inc.* **Circle No. 403, pages 21-22.**

Two shell molding resins coat sands on short cold mixing cycle. Resinox 5063 can be used for both blowing and dumping. Resinox 5064 is especially designed for dumping. *Monsanto Chemical Co., Plastic Div.* **Circle No. 404, pages 21-22.**

Shell core blower, the Chicopee Core Chief, has new, larger blow head adjustable for varied core box heights, stainless steel-lined cast iron oven doors, improved holders for quick box change, automatic heat control. Bulletin. *Shell Process Inc.* **Circle No. 405, pages 21-22.**

Shell sand Speedmullor Model CP gives operator full control over all variables in cold processing resin-coated sand. Six sizes from 2000 to 20,000 lb per hr produce free-flowing, non-clumping mixes in six minutes or less. Bulletin 6000 describes Model CP and also new three-station Formatic shell mold machines for dump production that is fully automatic or manual by way of control panel. Makes up to 120 24 x 30" shells per hour. *Beardsley & Piper Div., Pettibone Mulliken Corp.* **Circle No. 406, pages 21-22.**

Shell mold resins Durez 18250 for cold coating (alcohol and water solvent) and Durez 18123 for dry mix

work. 18250 can be used for dumping or blowing, gives up to 30% greater cold strength and superior hot strength. 18123 is reported to give uniform mold build-up in deep draws, to be stronger and faster curing. Bulletin. *Durez Plastics Div., Hooker Electrochemical Co.* **Circle No. 407, pages 21-22.**

Shell cores and molds are automatically blown in Model SP-1300 automatic machine. Blows and fully cures at rate of 50 to 90 cycles per hour. Maximum box size, 14" x 24" x 10". SP-1400 will take box 20" x 38" x 10." Bulletins. *Sutter Products Co.* **Circle No. 408, pages 21-22.**

Shell molding sand is produced at rate of 800-1200 lb per hour in Shell Mull unit using Simpson Porto-Muller, heater and hood, Elevayor, and vibrating screen. Makes precoated sand by hot method. Same unit with large muller increases capacity. Bulletin. *National Engineering Co.* **Circle No. 409, pages 21-22.**

New liquid shell mold resin can be applied to sand by cold or warm process, works for both dumping and blowing. No alcohol addition is required; material is safer to store. *Acme Resin Corp.* **Circle No. 410, pages 21-22.**

Shell-O-Matic shell molding machine has been modified for completely automatic operation including ejection. Designed for one-man, one-button operation, with electric counter registering shell production. Size is 20 x 26 x 8 in. but hopper can be masked for smaller shells. *Shell-O-Matic, Inc.* **Circle No. 411, pages 21-22.**

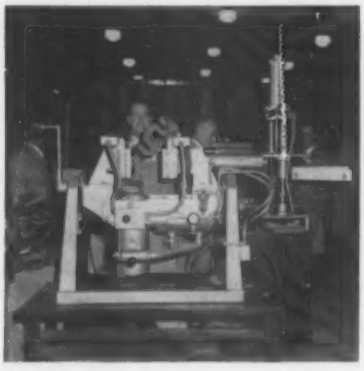
Plaskon Resin PS-9 is new urea core binder resin. Manufacturer claims better storage life, higher tensile properties and cost savings because smaller quantity is used. *Barrett Div., Allied Chemical & Dye Corp.* **Circle No. 412, pages 21-22.**

New shell core-making machine has six-station setup, can produce a core about every 18 seconds using cold coated sand. It is gas-heated and thermostatically controlled. *Spo, Inc.* **Circle No. 413, pages 21-22.**

Sand coating muller has special vaporizing system for introducing vapor to the sand and a special ventilating system for drying it. Muller is designed specifically for cold-coating sands for the shell process. Unit automatically mulls and coats sand using wetting agent, and thoroughly drys it so it is ready for use when it leaves the muller. *Shallway Corporation.* **Circle No. 414, pages 21-22.**

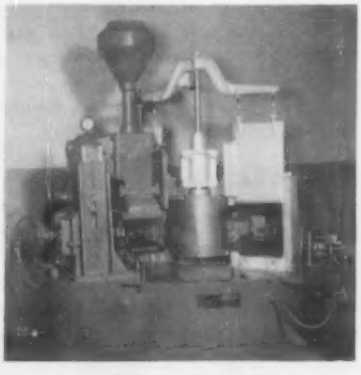
Nichols Roasting Furnace burns off resin binder from shell molding sand, reclaims sand for re-use. *Nichols Engineering & Research Corp.* **Circle No. 415, pages 21-22.**

Plaskon Resin R-169 is new shell molding resin for coating sand to be used in dump box operation. Manufacturer claims cost savings because less resin is needed; no peel back; no dust. Same resin is used for both shell molds and shell cores. *Barrett Div., Allied Chemical & Dye Corp.* **Circle No. 416, pages 21-22.**



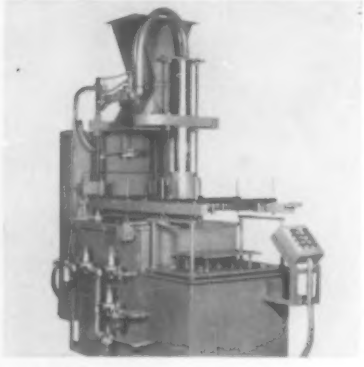
Shallco core blower, circle 456.

Harrison swing blower, circle 457.



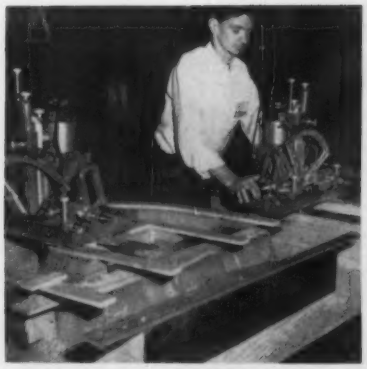
Chicopee Core Chief, flexible.

Sutter SP-1300, cores and molds.



Bio-Core for molds and cores.

Patternmaking



Patten core box router saves.

Freeman Supply, universal miller.

Oliver has southpaw band saw.

Pattern making equipment includes left hand band saw No. 116-D for work that would normally interfere with right hand saw. Available with standard or rolling table (travels 24″). Other advances include No. 103 pattern milling machine with table length increased to 127″ and separate motor for powering revolving table. Bulletins. *Oliver Machinery Co.* **Circle No. 417, pages 21-22.**

Plastic steel called Devcon by Chemical Development Corp. can be used for patching, patternmaking, investment casting molds for wax pattern production, and special machining fixtures, as well as many other applications. Handles like modeling clay, ready for use in minutes. Devcon A is non-sagging putty, Devcon B a semi-viscous liquid, Devcon C is heat resistant, Devcon F is aluminum putty. Bulletins N1-100 and N1-101. *Freeman Supply Co.* **Circle No. 418, pages 21-22.**

Patten Core Box Router is reported to save ¼ to ⅓ on pattern costs. Cuts up to 10¼″ in diameter of any length. Cuts straights, bends, elbows, tapers. Uses ball type or right angle fly type cutter. Bulletin. *Pattern Machine & Foundry Corp.* **Circle No. 419, pages 21-22.**

Salloy is new aluminum alloy for making match plates. Manufacturer claims it has excellent castability and high fluidity, eliminating need for fluxes and additions. Claims it produces fine textured surfaces, can be chromium plated to increase life, and may be heat-treated to obtain strength of 45,000 to 50,000 psi. *George Sall Metals Co.* **Circle No. 420, pages 21-22.**

Pattern wax in form of Superior Wax Fillet is new product not affected by lacquer solvents or usual cleaning fluids; known pattern coatings dry rapidly over it. Superior Hy-Temp Sheet Wax is tough, pliable, non-sticky, and warpless, has a melting point of 265-268 F. With pressure sensitive adhesive or can be applied with shellac as adhesive. Bulletins. *P.M.S. Co.* **Circle No. 421, pages 21-22.**

Patterns, matchplates, coreboxes can be produced in new aluminum-filled epoxy casting resin. Also new is Epoxical for use with or without glass cloth for applications requiring high strength, light weight, dimensional stability, extreme accuracy (material has low shrinkage). Bulletin IGL 400. *United States Gypsum.* **Circle No. 422, pages 21-22.**

Patternmaking equipment added to extensive line includes D-20 State Double Disc Sander with two 20-in. discs and tables that adjust independently. Direction of rotation reversible. Tables lower below disc to simplify disc removal. Also new is Wadkin WT2 universal milling machine for intricate work and close tolerances. Hydraulic copying device is available as an optional extra. Bulletins 5596 and WT-5604. *Freeman Supply Co.* **Circle No. 423, pages 21-22.**

Pattern wood with low dimensional change is Stabilite, a plastic impregnated mahogany laminate. Resists changes due to humidity, also stands elevated temperatures and has been used for experimental shell mold patterns. *Aetna Plywood & Veneer Co.* **Circle No. 424, pages 21-22.**

Patterns for production work are readily produced in castable epoxy resins that cure without heat. *Houghton Laboratories, Inc.* **Circle No. 426, pages 21-22.**

Corisa is new pattern lumber from South American tree. Somewhat lighter than pine, yet just as strong and more economical. Free from pitch, holds shape well under adverse conditions. Much of it is quarter-sawn. Excellent workability is claimed. Graded according to National Hardwood Association rules.

Kindt-Collins Co. **Circle No. 428, pages 21-22.**

"Berylco" shell mold pattern plates are made of beryllium copper at claimed cost savings. One master is first machined in a steel master cavity. Beryllium copper is then pressure cast in the master cavity to produce multiple impressions for pattern plates. Thus only one master cavity is required and machining of individual patterns is eliminated. High heat conductivity of beryllium copper gives good curing qualities. *Beryllium Corp.* **Circle No. 429, pages 21-22.**

Cerrobend, Cerrotru and Cerrocast are low-melting alloys used for duplicate pattern metals. Manufacturer claims non-shrinkage and dimensional accuracy. Molds and core patterns are made either by spraying or casting. They offer accurate duplication of wood patterns for getting a quick positive from a negative, and for soft metal dies for wax patterns. *Cerro de Pasco Corp.* **Circle No. 430, pages 21-22.**

Spindle sander for wood, metal and plastics has been developed for high-precision contour sanding or grinding. Tilting arbor. Exceptional accuracy and flexibility are claimed, two speed operation. Has own dust-collecting facilities. Rigid table is 24x30 in. *Kindt-Collins Co.* **Circle No. 431, pages 21-22.**

Testing and Inspection

Autoclay is automatic device to relieve technician of time-consuming job of making standard AFS clay determination. Each time a new sample is run the unit starts the filling-settling-siphoning sequence until stopped by operator. Bulletin. *Harry W. Dietert Co.* **Circle No. 432, pages 21-22.**

Spectromet is technical tool that can be operated by non-technical personnel to give complete analysis in 40 seconds. Designed for routine analytical control right on the foundry floor; concentration of up to eight elements at a glance. Bulletin 42. *Baird Associates, Inc.* **Circle No. 433, pages 21-22.**

Gamma ray projector Model 412 produced by Technical Operations for use with Iridium 192 is especially adapted to radiography of wide variety of shapes. Works with single casting, multiple radiography of many castings simultaneously, or circumferential test on one large casting. Bulletin "Gamma Radiography." *Picker X-Ray Corp.* **Circle No. 434, pages 21-22.**

Induction furnaces for determination of carbon and sulphur have been redesigned completely to permit continuous operation. Have new electronic components; no basic changes required to switch from metal to hydrocarbon samples. Bulletin. *Laboratory Equipment Corp.* **Circle No. 435, pages 21-22.**

X-ray film Type AA reduces exposure time up to more than 50% over Type A, depending on screens and radiation source. Sensitivity same as Type A. Bulletin. *Eastman Kodak Co., X-Ray Div.* **Circle No. 436, pages 21-22.**

Atomcounter is a recently developed direct reading spectrometer with provision for determining 18 elements (more by modifying machine). Dials are calibrated directly in per cent concentration. Spectra can also be photographed. Bulletin. *Jarrell-Ash Co.* **Circle No. 437, pages 21-22.**

"Speedy" gas detector is simple machine which can be set up as permanent installation or used as portable unit for testing aluminum melts. In the detector, a small test casting is frozen in a crucible under reduced pressure. Any gas present expands into large cavities which can be seen readily on sectioning. *Exomet, Incorporated.* **Circle No. 438, pages 21-22.**

Portable thermocouple for immersion temperatures in molten steels. Has excess thermal wire mounted in head so that in case of excess heat it can be drawn down and a new junction made. Expendable fused silica tips are usually used for only one immersion. *Charles Engelhard, Inc.* **Circle No. 439, pages 21-22.**

King Brinell microscope is designed for use with Brinell testers. Uses both natural and built-in light, (has own battery). Has special applicability for reading Brinell impres-

Thermocouple carries extra wire.

Minitron, portable gamma rays.

sions under difficult surface conditions. *King Tester Corp.* **Circle No. 440, pages 21-22.**

A.C.M.I. borescopes are designed for visual inspection of interior surfaces of castings for flaws. Standard models provide four most frequent angles of vision. In most instances visual area is about one inch at distance of one inch from objective lens. Wide range of lengths and diameters. Self-contained light source. *American Cystoscope Makers, Inc.* **Circle No. 441, pages 21-22.**

Radiographic inspection as an in-plant operation for small plants is promise of low-cost, extremely portable machine producing beam of gamma radiation from source of iridium 192. Minitron weighs 44 lb. Catalog J-362. *Budd Co.* **Circle No. 442, pages 21-22.**

General

Glascast disposable pattern process uses one-piece glass powder mold, is similar to lost wax process but eliminates need for investment material and containers, dewaxing ovens, power equipment to move investments, and all knockout equipment. Bulletin. *Corning Glass Works.* **Circle No. 443, pages 21-22.**

Pneumatic vibrators of two basic types are called Shock-Column (piston stopped by anvil) and Quiet-Action (piston stopped by air pressure). Latter with muffler to reduce exhaust noise is called Noiseless. Special design increases effective air pressures from 30 to 60%; also eliminates bolt breakage. Hopper car vibrators also available. Bulletin. *Vibron Div., Burgess-Sterbentz Corp.* **Circle No. 444, pages 21-22.**

Newest vibrators among the 52 Vibrolator types are: the T series for temperatures up to 1000 F; the lightweight, heavy duty series; the DH-41 for heavy vibration in plane parallel to surface being vibrated. Bulletin. *Martin Engineering Co.* **Circle No. 445, pages 21-22.**

Ross Base-Mounted Valves have new solenoid and cover assembly which protects against dust, splashing liquids, airborne contaminants. Can be manually operated without removing cover, becomes electrically inoperative when cover is removed. New Comet II is multi-purpose unit combining speed, small space, light weight. *Ross Operating Valve Co.* **Circle No. 446, pages 21-22.**

Glascast, powdered glass mold.

Protective coating for metals Markal Heatproof gives permanent protection against corrosion, scaling, and oxidation up to 1850 F, temporary protection up to 2100 F. Bulletin. *Markal Co.* **Circle No. 447, pages 21-22.**

Metallizing gun, new Mogul Turbo-Jet, has magnetic air control which gives uniform wire speed regardless of normal operating air pressure or variations in pressure. Sprays and deposits all types of metal in wires from 20 gage to 3/16 in. Bulletin 3903. *Metallizing Co. of America.* **Circle No. 448, pages 21-22.**

Blow gun has valve that controls from breeze to blast at touch of operator's thumb. Hook for hanging also protects operator's fingers. Separate valve stem plugs can be inserted to limit air. Bulletin BG-556. *Cleco Div., Reed Roller Bit Co.* **Circle No. 449, pages 21-22.**

Unistrut metal framing system demonstrates way to build any type of all-metal framing structure including pattern racks and storage bins. The system is adjustable, re-usable, and requires no drilling or welding. Catalog 600. *Unistrut Products Co.* **Circle No. 450, pages 21-22.**

Lub Air-Ator is a filtering pressure regulating and lubricating device for air tools and air mechanisms. *A. Schrader's Son Div., of Scovill Manufacturing Co.* **Circle No. 451, pages 21-22.**

Paintstik M-10 marks cold and withstands red heat, quenching, weathering, but removes easily in pickling batch. Paintstik B marks on oily, cold, icy, wet or dry surfaces. Bulletins. *Markel Co.* **Circle No. 452, pages 21-22.**

Case-sulphurizing of ferrous metals to reduce or eliminate seizure, fretting, and wear can be done with Lubri-Case process. Uses salt bath treatment at about 1050 F. Bulletin. *Lubri-Case, Inc.* **Circle No. 453, pages 21-22.**

Timing belt gives positive drive and accurate timing from slow as you want to 15,000 fpm. PowerGrip belt works well on small pulleys permitting speed ratios as high as 12 to 1, heat and oil resistant, doesn't require lubrication or dressing oil. Bulletin M-4271-A. *United States Rubber Co.* **Circle No. 454, pages 21-22.**

Colored resins are now used to produce Galvestos roofing and siding material in any of six colors. *H. H. Robertson Co.* **Circle No. 455, pag-**

F. B. Rote
Technical Director

E. F. Chojnowski
Research Metallurgist

J. T. Bryce
Chief Metallurgist

SULPHUR ADDITION MAKES UNUSUAL NEW IRON

Albion Malleable Iron Co. makes friend of old enemy

■ Malleable base spheroidal iron* is a new high-strength alloy containing graphite in a spheroidal form in a highly stable matrix. The principal alloy is sulphur, free or combined, added during melting or as a ladle addition. Annealing of the sulphur-stabilized iron is accelerated by concurrent addition of a solid-state graphitizer.

As sulphur content is increased above conventional levels, the internal graphite structure undergoes gradual transitions from temper carbon to rounded agglomerates, to duplexed spherulitic temper carbon, to true spherulitic.

Addition of sulphur stabilizes carbides and permits production of thick metal sections free of primary graphite. At the sulphur levels required to produce spheroidized graphite the fluidity of the alloyed iron is considerably greater than an unalloyed base, making pouring of thin sections feasible. The alloying elements are low cost and free of explosive reaction during ladle addition. Because sulphur produces a true alloying effect, no loss of effectiveness is encountered while the molten metal is held in the furnace or ladle. Excellent casting surfaces are produced in either green sand or shell molds.

The metal is heat treated by conventional anneal, quench, and draw processes. During draw treatments it exhibits a strong resistance to second-stage graphitization or segregation of carbides. Uniform matrix structures are produced, providing high tensile and yield strengths and ductility. The modulus of elasticity is uniformly high at 25 to 27 x 10^6. Machinability is excellent at high strengths.

Generally, the properties of malleable base spheroidal iron are similar to those developed in conventional pearlitic malleable with certain notable exceptions which make it a unique material with considerable potential advantages.

Research to date has been directed along many channels including:

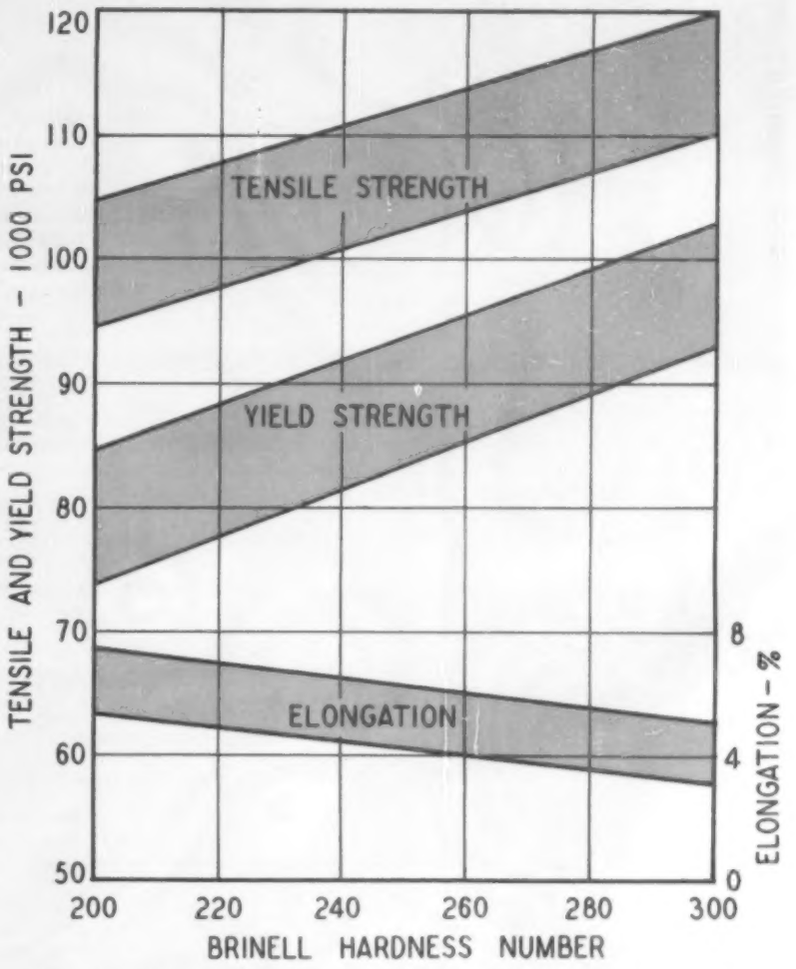
1. Control of iron composition to produce consistently each of the three spheroidal graphite types illustrated.
2. Liquid and solid-state graphitizers to accelerate annealing of the sulphur-stabilized iron.
3. Control of annealing conditions to develop a desired combined carbon content for subsequent heat treatment.
4. Heat treatment control.
5. Evaluation of the properties of the material.
6. Production of commercial castings.

Summarization of data which follows is taken from a phase of the work confined to test bars and castings made from iron treated to produce a duplex graphite structure.

A series of green sand molds for ASTM malleable test bars and 1 x 4 x 4-in. blocks was prepared and poured with duplex cupola-air furnace iron having a base composition of 2.34 per cent carbon, 1.65 silicon, 0.43 manganese, 0.143 sulphur, 0.03 phosphorus, and 0.03 chromium.

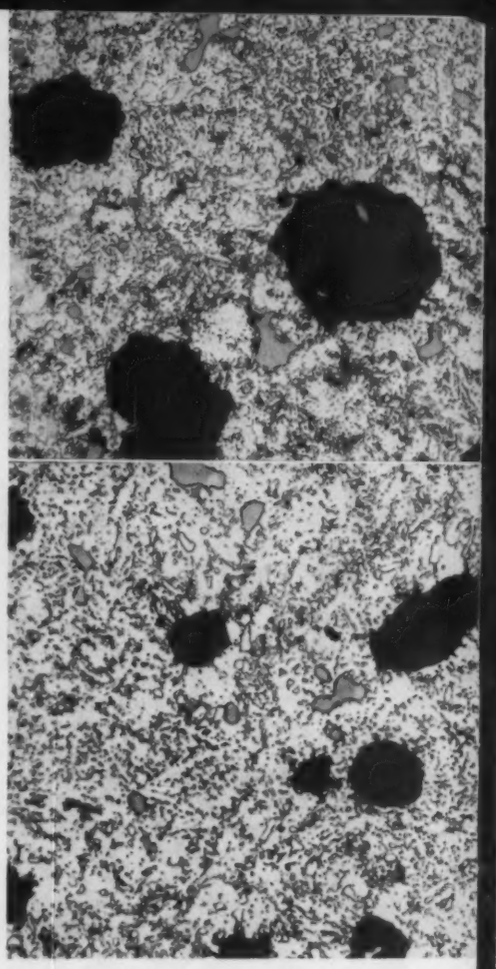
The base iron was treated with sulphur and a graphitizer to produce the duplex type graphite. This particular base iron required approximately 0.40 per cent sulphur to produce the desired graphite structure. The castings were annealed in a radiant tube fired, atmospheric controlled pearlitic malleable annealing furnace. First-stage annealing was at 1720 F. The work temperature was dropped to 1550 F. before discharge, when the castings were air cooled.

After air cooling, the castings were heated to 1575 F for 45 min-



Mechanical properties for over 500 oil quenched and drawn MBSI test bars.

* U. S. Patent Application No. 543,419



MBSI microstructure at 500X.

utes at temperature, quenched in oil, then separated into groups and drawn at temperatures of 1100, 1200, 1300, and 1345 F for periods of 1 hr to 19 hr at temperature. The test bars were turned to 0.505-in. diameter and tested with SR-4 strain gages on one bar of each pair for stress-strain determination. The 1 x 4 x 4-in. blocks were used for machinability tests.

Hardness after quenching in oil was 555 to 600 bhn. At all draw temperatures the hardness dropped considerably from the quenched hardness in 1 hr or less at temperature. The hardness obtained in even 16 hr at 1100 F remained relatively high—269 bhn. At 1200 and 1300 F the hardness developed with short-time draw treatments was at a level considered optimum for the best combination of strength and good machinability, and in times ranging from four to 16 hr controllable intermediate hardness levels were obtained. At 1345 F hardness

decreased rapidly at short draw times, then leveled off at an intermediate level.

Two significant features of MBSI were brought out in this series of tests. Draw heat treatments in the temperature range of 1200 to 1345 F. produced essentially the same hardnesses, regardless of temperature, for draw times of 4 hr or longer. This indicates a lack of sensitivity of the material to draw temperature, and indicates the possibility of a high level of hardness controllability. In addition the iron exhibited a high degree of stability on prolonged heating at draw temperatures in a range of 1200 to 1345 F. This is evidenced by a levelling off of hardness after 8 hr at temperature.

Micrographic study indicates essentially no second-stage graphitization taking place, the structure consisting of uniformly distributed spheroidized cementite. Thus high levels of uniformity of matrix microstructure can be developed with concurrent high levels of properties and freedom from stress.

Drawing MBSI at 1200 F for extended periods reduced tensile strength from 120,000 psi to somewhat under 105,000 psi, while yield strength decreased only slightly from somewhat over 90,000 psi to about 87,000 psi. Elongation increased moderately from 4 per cent after 2 hr at temperature to 5½ per cent after 19 hr at temperature. After 8 hr little further change in properties occurred with increasing time at draw temperature.

Similar decreases in tensile and yield strength accompanied increased draw time at 1345 F. Tensile strength stabilized at between 95,000 and 100,000 psi, and the yield strength between 75,000 and 80,000 psi. Elongation increased somewhat more with the high draw temperatures, reaching a maximum of 7 per cent at 1345 F. Stability of properties with extended draw times parallels the hardness stability mentioned previously.

The high level of properties developed for pearlitic malleable is about the same as that developed by MBSI. However, conventional pearlitic malleable is time and temperature sensitive; requiring good control during heat treatment.

The lower sensitivity of MBSI lessens the control requirement,

and provides certain special advantages for this material. For example, since the matrix is uniform and temper resistant, selective hardening may be accomplished without fear of excessive softening beneath a hardened surface layer. Further, a high degree of uniformity in the heat treated structure can be expected as a result of the initial uniformity of the quenched and drawn base iron.

At high levels of hardness, MBSI shows about the same range of properties as commercial pearlitic malleable produced by oil quenching and drawing. At intermediate hardness ranges, 200 to 240 bhn, much higher properties are obtained in MBSI due to the uniformity and stability of the matrix.

Stress-strain curves for MBSI at four hardnesses between 321 and 179 bhn show tensile strength ranging from 123,500 to 95,900 psi, yield strength from 118,500 to 68,000 psi, and elongation from 2 to 7 per cent. Elastic modulus was uniformly in the range of 25.4 to 27.0 x 10^6.

Considerable experience in turning and finishing test bars and test castings has indicated that freely machinable structures are obtained at hardnesses lower than about 280 bhn. Lathe operators have not been able to distinguish between pearlitic malleable and MBSI at the same hardness.

Drilling torque and thrust tests indicate that pearlitic malleable and MBSI require approximately the same horse power per cubic inch of metal removed at a given hardness. This is significant since in the hardness range of 200 to 240 bhn, MBSI has high tensile properties, which coupled with a high modulus of elasticity and good machinability, promises considerable value in the engineer-field.

Alloying for control of the graphite structures may be accomplished in the primary or secondary melting furnaces or by ladle addition, since the control is a true alloying rather than an inoculating effect. The materials employed are low in cost and readily available. Alloying during melting develops no visible reaction, nor does it require special melting practice beyond the degree of control normally exercised in a duplexing operation.

Addition of alloying materials to

the ladle is accompanied by a reaction similar in appearance to that observed during inoculation with ferrosilicon. With the ladle addition, however, there is a sulphurous odor which requires adequate exhaust to avoid unpleasant atmospheric conditions. No such gaseous evolution occurs in metal alloyed during melting. There has been no evidence that the alloying effects of sulphur and the necessary graphitizers wear off with time in the ladle or furnace, nor is there a section sensitivity.

Fluidity of MBSI is considerably greater than that of the unalloyed base. A control spiral used at Albion Malleable shows an increase from about 14 in. in unalloyed iron to up to 30 in. in sulphur alloyed iron poured under the same conditions. Thin metal sections have been poured with a high degree of success.

Exact influence of graphite shape within the range which can be produced by sulphur alloying has not been clearly evaluated. At certain hardness levels, the mechanical properties of pearlitic malleable iron and MBSI are similar. This is most clearly indicated in the range of 241 to 285 bhn. Below 241 bhn, MBSI possesses markedly higher levels of mechanical properties than pearlitic malleable. While undoubtedly related to the shape of the graphite, this is unquestionably also related to the matrix structural uniformity of MBSI.

End quench hardenability of Albion's base iron and MBSI is about the same as that of an SAE 4140 steel. This makes the materials amenable to oil hardening throughout a moderately heavy section.

This article is condensed from the paper *"Malleable Base Spheroidal Iron"* which was presented at the joint Malleable-Gray Iron Round Table Luncheon during the AFS Castings Congress & Show in Atlantic City, May 3-9.

More information on any of the products and services advertised as listed in MODERN CASTINGS can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 21-22.

Ask Your Help in Evaluating Test

■ A very promising hot test using the load created by expansion offers promise, but promises aren't worth a thing unless backed up. Foundrymen with the equipment, are invited to help back up the promise by running tests and reporting the results to Hans J. Heine, Technical Director, American Foundrymen's Society, Des Plaines, Ill.

As mentioned, the test involves load created by expansion where specimen length is held constant at a temperature of 1800 F. This is termed "expansion load" and expressed in psi. The sand specimen is subjected to a load as created by the expansion. Test runs as follows:

1. Equip dilatometer as for hot strength test.

2. Heat the furnace to and maintain it at 1800 F.

3. Ram a 1¼" x 2" specimen to the same mold hardness as sand is rammed in foundry. Strip specimen out of tube so about 1/32" shows. Press tester against the end of specimen. A single drop of the weight from a predetermined height is employed (determine by trial). Build up the required height of weight drop to ram sand to the mold hardness used to make the test casting (a group of ¼ thick, 2" diameter washers having a hole in the center for a quarter-inch bolt are satisfactorily used at present. Some 1/16" washers are also needed to give a small increment of height. A 70 mold hardness needs about a ⅜" drop and an 80 mold hardness about 1¼ inches. Record height of drop and weight of sand. These assembled washers are put under the rammer weight and pulled out from under the weight to give correct weight drop.

4. Place the rammed specimen in dilatometer as if for strength test.

5. Immediately apply just enough load on the specimen to cause good contact with post—about ½ lb, for example.

6. Set dial indicator under dirt pan to zero. For 8-L work, use hot deformation recorder to measure height of specimen. Draw a line around drum, and set recorder pencil on this line.

7. Start stop watch.

8. Keep enough load on the spec-

imen to keep it from expanding; hold it within 0.0005". (For 8-J tests, use the screw hand pump on old filatometer to apply load. An oil release valve also works after some practice.)

9. Record time and load in psi every 15 seconds for first three minutes, then every 30 seconds up to 5 minutes.

10. Obtain total of load readings; divide by 16 for average load.

11. Make two tests per sample.

12. Sand with expansion load above 10 psi will show scabs or rat tails. The higher the expansion load, the greater the scab area. A straight line relationship exists.

13. Now plot data: expansion load vs. square inches of scab area. This test does not differentiate between scab, buckle, or rat tail. All are mold wall fracture defects. Other than that, it is simple and so far shows good correlation.

■ Here are more tests that show good correlation:

1. Re-plot the hot strength – hot deformation diagram from the recorder. Temperature should be 1800 F. A group of stress-strain diagrams should all go through zero.

2. Find origin of each recorder diagram by drawing a straight line through lower half of diagram. Where this line crosses zero load is the beginning of diagram. Use this point as zero deformation.

3. Show square inches of scab area on each re-plotted diagram. Diagrams which are steep have high scab areas. The ordinate denotes hot strength. A diagram for sand with zero scab area shows a small angle.

4. A modulus of brittleness may be calculated by dividing 100 by hot deformation that occurs at 100 psi load at a temperature of 1800 F.

5. Plot brittleness vs. square inches of scab area. Use brittleness as ordinate. The higher the brittleness, the greater the scab area. Zero scab is around 1000, while 20 square inches of scab is 100,000.

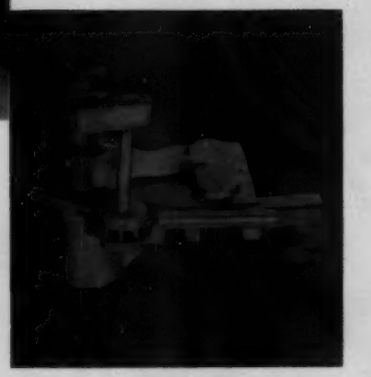
■ The recorder now being used for these tests is equipped with a timer for hot strength – hot deformation testing. So far, no definite correlation has been found where time was used as one of the axes. It might pay to use a timer on the dilatometer on 8-L work. It doesn't slow up the test, and the extra data may prove valuable.

WINNERS SHOW SKILL

1ST PRIZE STEEL

Mert West, 21, graduated from high school in Springfield, O., in 1954 and became a molder learner as Springfield's O. S. Kelley Co.

1ST PRIZE GRAY IRON



Stanley R. Varr, 25, named Rhode Island's outstanding apprentice by the NAM, works for Brown & Sharpe Mfg. Co., Providence R. I.

1ST PRIZE NON-FERROUS

Donald R. Tetzlaff, 21, wound up his apprenticeship as a brass molder for Allis-Chalmers, Milw., in a blaze of glory by his victory.

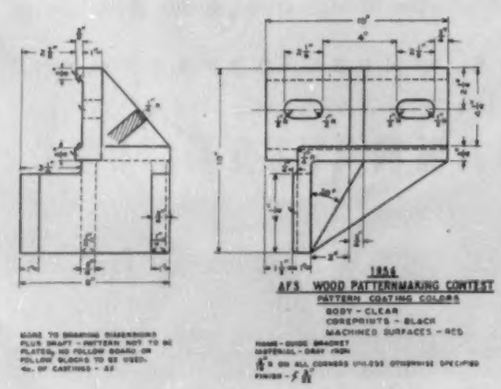
Judges find unusual quality in record 431 entries in AFS's 33rd national contest for beginners and learners in the metal castings industry

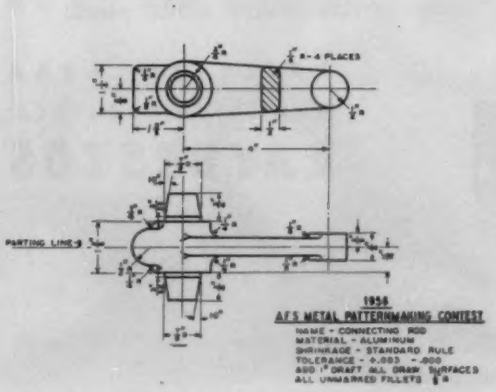
The work pictured on these pages represents the best efforts of some 430 apprentices and students who submitted entries in the Robert E. Kennedy Memorial Apprentice Contest of the American Foundrymen's Society.

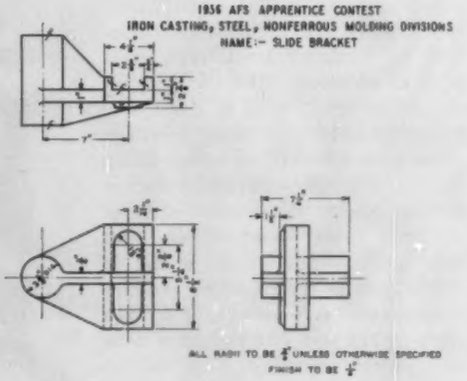
The judges who gathered in Chicago at the Chicago branch of the University of Illinois remarked that the unusually high quality of the entries probably reflects the fact that a record number of 16 AFS chapters held chapter-wide apprentice contests, thus thinning out the number of entries from those areas. However, even with the preliminary contests, the number of entries exceeded those of any recent year.

Winning entries were exhibited at the AFS Casting Congress & Show in Atlantic City where the five first place winners were the guests of the society.

Judges who determined the final winners were: Burt Eleder, Link-Belt Co.; Michael W. Senew, Pennies Industrial X-Ray Co.; Ray Johnson, Woodruff & Edwards; O. H. Harer, Scientific Cast Products Corp.; R. E. Seifert, National Malleable & Steel Castings Co.; Dan M. Stockbarger, Chicago Pattern Works; R. T. Leisk, American Steel Foundries, Inc.; Edmund W. Woods, Pentagon Pattern & Eng. Co.; Joseph J. Schallerer, Calumet Pattern Works, Inc.; Frank J. Mackett, Crane Co.; Richard L. Olson, Englewood Pattern & Model Works, Inc.; H. K. Swanson, Swanson Pattern & Model Works; Cornell G. Mate, Greenlee Fdry Co.;







In Kennedy Memorial Apprentice Contest

1ST PRIZE WOOD PATTERN

Herb Nelson, 25, of the Pacific Pattern Works, Tacoma, Washington, has spent four years and 10 months at his apprenticeship.

1ST PRIZE METAL PATTERN

Herbert L. Zigler, 27, Motor Patterns Co., Cleveland, made the grade in a big way after having many interruptions in his career.

John MacDonald, Pettibone Mulliken Corp.

Acting as hosts for the University of Illinois were Roy W. Schroeder, R. M. Price and Fred W. Trezise.

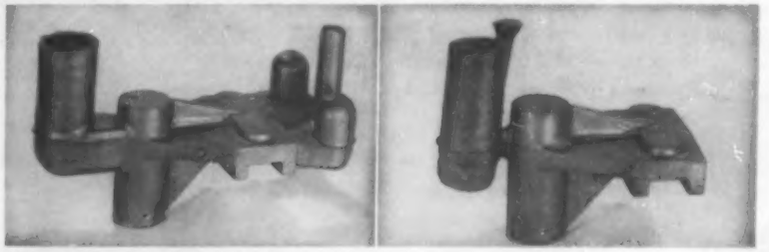
Although this was the 33rd apprentice contest that AFS has held, it is the first to have been called the Kennedy contest in memory of Robert E. Kennedy, late secretary emeritus of AFS who started the events in 1923.

Contestants eligible to enter the contest included any learner or trainee in the all-around practice of the trade who has not had over five year's experience in the pattern trade, nor more than four years in the foundry industry.

A review of the biographies of the winners indicates that the age of 25 is a favorable one for winning apprentice contests. Education is generally an important factor in the careers of the winners, as virtually all were high school graduates, several had advanced training in trade schools, and two are continuing

2ND PRIZE WINNERS

Winners Zohil, Calhoun, Montano, Poole, and Stobierski



Steel winner was Joseph J. Zohil, 25, of the Dodge Steel Company, Philadelphia, Pa.

Gray iron winner was E. P. Calhoun, 25, from Howell Foundry, Los Neitos, California.

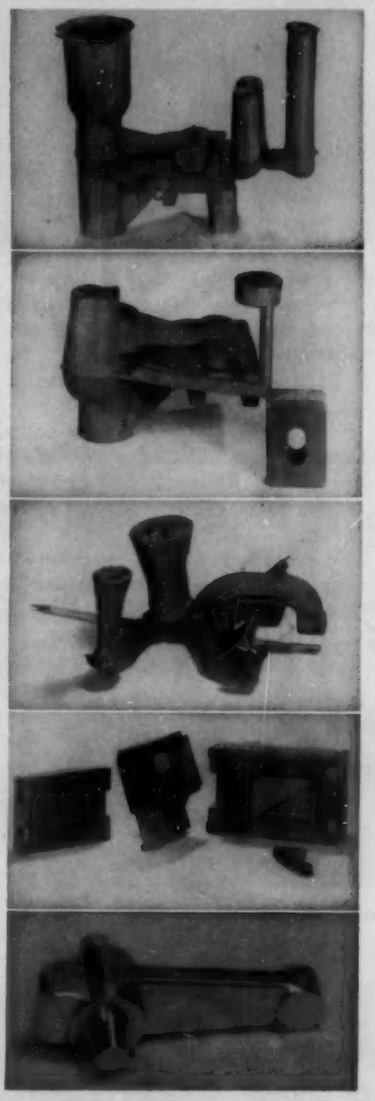
Non-ferrous winner was R. J. Montano, 21, apprentice from Ampco Metal, Inc., Milwaukee.

Wood pattern winner was Ed R. Poole, 25, Washington Iron Works, Seattle, Washington.

Metal pattern winner was Stanley Stobierski, 21, from Cove Pattern Works, Cleveland.

Lawson Walton Berge Backus Smith

3RD PRIZE WINNERS



STEEL

Jesse Lawson, 19, works at the Continental Foundry & Machine Division of Blaw-Knox Company.

GRAY IRON

James R. Walton, 25, is now a classroom instructor at Caterpillar Tractor Co., Peoria, Illinois.

NON-FERROUS

Arthur A. Berge, 30, is a molder for St. Catharines Brass Works, St. Catharines, Ontario, Canada.

WOOD PATTERN

Lewis Backus, 21, has been at Cleveland Standard Pattern, Cleveland, Ohio, for four years.

METAL PATTERN

James A. Smith, 19, is now apprenticed at the Annex Pattern Company, Detroit, Michigan.

their educations by attending college at night. Many of the winners have completed their military service obligations with several having spent from four to seven years in the service.

While some of the young men have pursued only their present trade, many have tried a number of occupations and some have had long waits to find openings as apprentices.

Steel Foundry Dust Control And Ventilation

■ The headline is the name of a symposium on foundry dust control consisting of the following sections:

1. Dust Control on Stand Grinding Machines
2. Dust Control on Swing Frame Grinding Machines
3. Dust Extraction on the Pneumatic Chisel
4. A Low Volume High Velocity Exhaust System
5. Sampling and Assessment of Airborne Dust
6. Efficiency of Dust Collectors
7. Foundry Ventilation and Heating
8. Dust Control at Foundry Shakeouts.

Section 1. Effective dust control on pedestal grinders is obtained by using exhaust rates of 500 cfm for a 24-in. dia. wheel or 650 cfm for 30-in. dia. wheel. These low air volumes – 610 and 880 cfm are standard – were effective because of the introduction of the following modifications to the wheel hood:

1. Closing the gap beneath the work rest
2. Minimizing the air gap between the sides of the cowling and the wheel
3. Fitting an easily adjustable top flap
4. Perforating the work rest or using a roller-type rest

An interesting feature of the system consists of a compensating air supply.

Section 2. An excellent evaluation is made of the various types of exhaust systems for swing frame grinders. The types studied were:

1. Down-draft system
2. Booth (side draft) system
3. Integral system (Exhaust applied directly to the wheel)
4. Combination booth and integral system

Efficiencies of the several systems are evaluated by the Tyndall beam technique. Velocity contours due to the fanning action of the wheel and those due to the exhaust system were measured. These findings formed the basis for design and modification of the exhaust systems. Exhaust volumes found to be effective are reported.

Section 3. Dust from the use of

pneumatic chisels was uniquely controlled by inserting a piece of tubing through the glove worn by the workman. The tube pierces the glove between the thumb and forefinger of the hand that holds the chisel. Exhaust air flow in the tube is 13.5 cfm at a velocity of 10,000 fpm.

The authors claim that this method of dust control is superior to that obtained by use of exhausted hollow chisels ("Vacuum Chisels and Grinders Cut Cleaning Room Dust," MODERN CASTINGS, May 1956, p. 124).

Section 4. Low air volume high velocity exhaust systems are described for:

1. Hollow chisels
2. Portable grinders
3. Bench grinders
4. Surface grinders
5. Swing frame grinders
6. Pouring operations

Using an exhausted ring around the pouring basin of a mold, magnesium fume was successfully controlled with 70 cfm at a negative pressure of 1 in. mercury.

Section 5. An excellent evaluation is given of the types of air sampling equipment used in England. Foundry dust concentrations, significance of particle size, and sample evaluation are treated.

Section 6. The section on the efficiency of dust collectors is well illustrated. Tables showing the efficiencies of various types of collectors give values in good agreement with American experience.

Costs of collection equipment per 1000 cfm are reported for the various types of collectors. Operating costs and capital charges are included. No mention is made of hidden expense such as cost of disposal of collected material, special electrical service, supporting structures, etc.

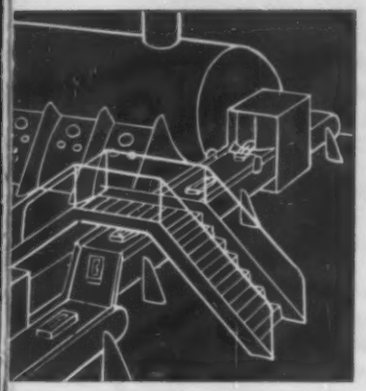
Section 7. The section on foundry heating is especially interesting in that the problem is approached on the basis of radiant heat. Temperature measurements made with the globe thermometer indicate that the authors have a due appreciation of the considerable effect of radiant heat when ventilating or heating foundry buildings. The statements made in this section are in excellent agreement with those found in the newly published AFS ENGINEERING

continued on page 100

Castings Congress and Exhibit

News Story

continued from page 49



parts. To achieve variations, molds were constructed with insert blocks that may be removed to modify the mold cavity.

Tensile Properties of Aluminum Silicon Magnesium Alloys and the Effects of Sodium Modification, R. C. Harris, S. Lipson, and H. Rosenthal, Frankford Arsenal, Philadelphia. The authors described a study of some mechanical properties of aluminum-silicon-magnesium alloys centering around the composition range of the 356 alloy, paying particular attention to the influence of sodium modification on these properties. The results indicated then, within the range of silicon contents studied, there is a pronounced sensitivity to magnesium content.

An Evaluation of ZH62XA Magnesium Sand Casting Alloy, K. E. Nelson and W. P. Saunders, Dow Chemical Co. Magnesium sand casting alloy combines a reasonable degree of castability with excellent tensile properties at room temperature. Nelson and Saunders reported that it is intended to supplement or replace alloys ZK51A and ZK61A. (Preprint 56-64).

Effects of Section Size Variations in a Test Casting on Properties of Some Mg-Al-Zn Alloys, W. E. Pearson, Dow Chemical Co., Midland, Mich. A testing casting called a "slope casting" which has a range of section sizes was developed to provide tensile properties equivalent to those obtained from typical production sand castings. Pearson reported that the slope casting was useful in alloy development, heat treatability, gairn size, and porosity tendency studies. (Preprint 56-63).

Modifications in Vertical Gating Principles, K. R. Grube, R. M. Lang and J. G. Kura, Battelle Memorial Institute, Columbus, Ohio. Reporting on research sponsored by the American Foundrymen's Society, the paper suggested increasing yield by substituting step gates for a continuous web; this also allows the gating system to be cut from complicated castings more readily. Under most conditions a gate at least ⅜ in. thick should be used to minimize turbulence. Step gating tends to increase porosity in the casting immediately behind the step; in some castings this is enough of a disadvantage so that steps should not be used.

Theoretically, the authors indicated, metal screens could exclude dirt and dross and thus were a possible substitute for a runner extension which receives the first metal poured. Experiments showed that when good pouring practice was followed, screens were not needed and that when pouring practice was not good, screens were ineffective. The investigation included experiments with screens in the side riser as well as in the runner.

New Aluminum Permanent Mold Casting Alloys C355 and A356, R. C. Lemon and H. Y. Hunsicker, Aluminum Co. of America, Cleveland. Two high purity variations of alloys 355 and 356 have been developed to widen the range of mechanical properties available. For applications requiring maximum strength, C355 in the T62 temper provides test bar values (separately cast) of 52,000 psi tensile strength, 44,000 psi yield, and 4 per cent elongation. The higher ductility of this alloy at T61 temper matches 356-T6 but is accompanied by appreciably higher tensile and yield strengths.

A356-T61 has about double the ductility of 356-T6 and tensile and yield strengths that are somewhat higher. In the T6 temper, A356 has a typical elongation of 15 per cent and is suited for applications requiring especially high ductility. (Preprint 56-62).

New Aluminum Casting Alloy XA-140 for Elevated Temperature Applications, R. C. Lemon and W. E. Sicha, Aluminum Co. of America, Cleveland. This new alloy is designed primarily for applications requiring good strength at temperatures in the range of 400 to 600 F —gas turbine engines, compressor casings, airframe, and guided missile parts. Chemical composition includes 8 per cent copper, 6 per cent magnesium, and 0.5 per cent each of manganese and nickel. At temperatures of 400 to 600 F, tensile and fatigue strengths of XA140 are superior to those of other commercial aluminum casting alloys, and resistance to loss of high temperature strength upon prolonged heating is outstanding. Limited production has demonstrated that the alloy has good casting characteristics. (Preprint 56-61.)

Gas in Light Alloys, was the subject of a panel discussion at the Light Metals Round Table Luncheon. Panelsists were: **Methods and Apparatus for Measuring Gas Content of Melts,** S. Lipson, Frankford Arsenal, Philadelphia; **Application of Degassing Methods to Production,** W. A. Mader, Oberdorfer Foundries, Inc., Syracuse, N. Y.; **Production Results and Casting Quality,** B. J. Alperin, Erie Foundries, General Electric Co., Erie, Pa.

Malleable

■ A shortened anneal and the production of a new iron by making sulphur additions were features of the program of technical papers presented by the Malleable Division.

Effects of Charge Proportions, Furnace Atmosphere Flow Rate, and Melt-Down Time on Properties of Malleable Iron, A. H. Zrimsek, American Steel Foundries, Chicago; E. H. Belter and R. W. Heine, University of Wisconsin. (Fifth Malleable Research Progress Report.) The report emphasizes the importance of the chemical changes occurring during the melting cycle. Metal properties are seen to be related to oxidation which in turn depends on the materials in the charge, proportioning of the charge, physical structures of the charge, melting time and furnace atmosphere. These chemical effects of melting practice are further complicated by the influence of oxidation on residual elements introduced, and especially by pig iron. This effect of pig iron may be related to its residual elements and merits future study. (Preprint 56-85).

Annealing on a Five-Day Week Basis, R. V. Righter, plant manager, Central Foundry Division, General Motors Corp., Danville Plant, Danville, Ill. Use of bismuth-boron as an innoculant and a nitrogen atmosphere for annealing shortened the annealing cycle from 32 hours to 22.3 hours at the Danville plant. This made it possible to stop seven-day round-the-clock operation of the annealing department and return to more normal hours. It also permitted increased production in the department without adding equipment. Bismuth-boron innoculants permit operation in a broader range. Castings have been left in the kilns 72 hours without experiencing deleterious decarburization. (Preprint 56-83).

Consideration of Factors Governing Selection of Modern Malleable Heat Treating Equipment (panel discussion by Controlled Annealing Committee). Among considerations in the selection of heat treating equipment are (1) to meet customer demands, (2) to enhance machinability, (3) to facilitate continuous flow, (4) to heat-treat efficiently, and (5) to help maintain consistent quality. L. R. Jenkins, metallurgist, Wagner Malleable Iron Company, Decatur, Ill., discussed decisions of his company in selecting such equipment.

Comparison of Liquid and Air-Quenched Pearlitic Malleable Irons. Report of Pearlitic Malleable Committee. Committee chairman R. W. Heine reported as study of metallurgical data from three producers of air- and liquid-quenched pearlitic malleable irons that show the

At the Plant and Plant Equipment session were; standing, Sten Linander, Harold Weimer; seated, E. H. Neilsen, James Thompson, and Manuel Tama.

process of reheating, liquid quenching, and then drawing is successful for producing ASTM grade 60003 and 80002 grades of pearlitic malleable. Air quenching and drawing is successfully used to produce ASTM grade 60003 and lower yield strength pearlitic malleable such as grades 53004, 48004, and 45007. Liquid quenching and drawing has been demonstrated as able to produce higher yield strength at a given hardness than quenching and drawing, according to the committee's report. (Preprint 56-84).

Welding of Castings. Report of Joint AWS-AFS Committee on Welding Iron Castings. This report was presented in three parts as follows: **Definitions**—G. A. Meyer, Jr., Malleable Founders' Society, Cleveland; **Specifications for Filler Metal**—H. V. Inskeep, Linde Air Products Co., Newark, N. J.; **Test Block for Welding Cast Iron**—W. W. Edens, Allis-Chalmers Co., Milwaukee.

The Nucleation of Graphite During the Decomposition of Cementite, E. G. Haney, Aluminum Co. of America, New Kensington, Pa.; M. F. Hawkes, Naval Ammunition Dept., Oahu, T. H. White cast irons were deformed by rolling, shot peening, and twisting in torsion prior to graphitizing in a series of tests that demonstrated that in all irons where plastic deformation took place, the number of graphite nodules increased.

Malleable Base Spheroidal Iron, F. B. Rote, E. F. Chojnowski, and J. T. Bryce, Albion Malleable Iron Co., Albion, Mich. At the joint Malleable-Gray Iron Luncheon, these Michiganders told how sulphur additions can be used to make malleable base spheroidal iron, a high-strength alloy with graphite in a spheroidal form in a highly stable matrix. (Modern Castings, June, page 79 and Preprint 56-81).

Malleable Division Shop Course. Panelists were: W. F. Tragarz, International Harvester Co., Chicago; R. H. Greenlee, Auto Specialties Mfg. Co., St. Joseph, Mich.; Medie Hakeman, John Deere Malleable Works, East Moline, Ill.; T. E. Barlow, Eastern Clay Products Dept., International Minerals and Chemical Co., Chicago; C. F. Joseph, Central Foundry Div., General Motors, Corp., Saginaw, Mich. In presenting the subject, **Molding Methods for Malleable Iron Green Sand Molding,** Tragarz stated that green sand molding methods, coupled with improved molding machines can give the foundryman flexibility and adaptability to all types of castings at lower cost. **Dry Core Sand Method,** as described by Greenlee, is a "method whereby a mold is produced entirely from conventional core sand mixtures using sand, cereal, water, oil and occasionally iron oxide and silica flour." Mold components are made by using joltram molding machines, and are stripped from the pattern and place in core ovens for curing. **Mold Blowing** was described by Hakeman who in 1952 made his first attempt to produce castings by stack molding with each section of the mold produced on a mold blower. **Applications, Advantages and Limitations of Shell Molding** were detailed by Joseph who stated that "The advent of the shell molding process . . . has done more in our opinion for the casting industry in the past five or six years than any other development in its history."

Metallography for the Foundryman

■ The symposium was presented in two parts by the following: A. M. Montgomery, Aluminum Co. of America, Cleveland, *Good Metallographic Practices;* L. F. Mondolfo, Illinois Institute of Technology, Chicago, *Metallography of Aluminum and Its Alloys;* G. E. Holdeman, Dow Chemical Co., Midland, Mich., *Metallography of Magnesium and Its Alloys;* P. C. Rosenthal, University of Wisconsin, Madison, *Ferrous Metallographic Practice;* J. J. Connelly, American Brake Shoe Co., Mahwah, N.J., *Metallography of Copper and Nickle-Base Alloys and Stainless Steels;* Walter W. Edens, Allis-Chalmers Mfg. Co., Milwaukee, *Management of a Metallographic Laboratory.*

Noise Control

■ The fact that failure to study this problem can result in a large out-of-pocket expense has perked up the ears of many foundrymen and the noise control sessions had a large attendance.

Compensation Trends in Loss of Hearing, Floyd Frazier, National Association of Mutual Casualty Companies, Chicago. Speaking at the Noise Control round table luncheon, Frazier reviewed the background of this compensation problem and discussed several phases of the problem including: developments affecting legislation, causative factors in loss of hearing, the economic impact of claims, and actual and proposed solutions to the problems.

Foundry Noise Control—A Demonstration, F. A. Patty, General Motors Corp., Detroit. This demonstration of noise control methods includes a demonstration of the types of inclosures that can be built around foundry noise sources and of the elimination of resonance in steel plates.

Typical Foundry Noise Exposures, Edward G. Meiter, Employers Mutual Liability Insurance Co. of Milwaukee, Wis. Meiter explained the typical noise exposures in the foundry and the noise levels of various operations to show the principal sources of noise.

The Mechanics of Hearing and Hearing Loss in Noise Deafness, A. L. Goldner, M.D., Flushing, N. Y. An explanation of the mechanics of hearing and of how noise affects hearing ability was presented by Dr. Goldner. He distinguished between the effects on hearing of industrial noise, drugs, old age, and diseases of the ear.

Panel Discussion—Short Case Histories in Foundry Noise Control. Panelists were: A. L. Cudworth, Liberty Mutual Insurance Co.; James Botsford, Bethlehem Steel Co.; E. L. Lund and W. O. Hansen, Allis-Chalmers Mfg. Co., La Crosse, Wis.

Pattern

■ Patternmakers gave their complete attention to the problems created by the new epoxy pattern developments. Reporters attending the pattern sessions observed keen interest in the epoxy resin patterns among management and operating people from foundries.

Use of Epoxy Resin as Pattern Material, E. J. McAfee, Puget Sound Naval Shipyard, Bremerton, Wash. Three ways to make epoxy resin patterns through the new methods that omit curing equipment were detailed. (MODERN CASTINGS, May, page 72)

Opportunities and New Developments of the Patternmaking Industry, M. K. Young, U. S. Gypsum Co., Chicago. Epoxy resins will eventually replace wood patterns to a large extent in Young's opinion. He stated that pattern makers should not be afraid of losing work because of the new development, but should learn to utilize the new material.

Metal Patterns and Core Boxes with Metal Dryers, O. C. Bueg, Arrow Pattern & Engineering Co., Erie, Pa. Problems and solutions involved in the production of metal patterns and core boxes with metal dryers were detailed by Bueg, and in the discussion following his paper he stated that he hoped that the introduction of the CO_2 process would eliminate the need for dryers.

Patternmaking—Man to Man, Dr. Ralph L. Lee, Lee Hobby Foundry, Birmingham, Mich. Dr. Lee stated that he is "just wild about patternmaking" as he described the importance and the value of pattern production in his own hobby foundry and in other shops.

Plant and Plant Equipment

▪ Efficiency and high production rates were the obvious concerns of the men who presented papers in the Plant and Plant Equipment meeting and in their joint meeting with the Gray Iron division.

Melting Malleable Iron with Pulverized Coal and Oil as Fuel, E. H. Nielsen, consulting engineer, foundry equipment, Whiting Corporation. Mr. Nielsen discussed an installation of pulverized coal and oil equipment installed on a duplexing malleable iron furnace in Sweden. The combined fuel was found to give better control of oxidation than firing with coal or oil separately. There were savings in lower oxidation, higher fluidity, more uniform metal and lower cost of charging material.

Recent Development of the Coreless Line Frequency Induction Melting Furnace in European Foundries, Otto Junker, president Otto Junker G. m.b.H. Lammersdorf, Germany. Mr. Junker's paper was read by Manuel Tama, vice president of Ajax Engineering Company. Dr. Karl Scherzer, German representative of Ajax Engineering, also interpreted portions of it. The furnace is used for melting both non-ferrous metals and cast iron, and has recently been used for melting steel. In Germany, turnings and chips can be used at a price one-fourth that of pig iron, and if another fourth is added for the price of melting, the foundryman has liquid metal for one-half the price of pig. Lining costs are low. The furnace is single-phase, toward which power companies are unsympathetic in this country, but the Germans haven't been able to build a successful three-phase furnace.

Sand

▪ The most controversial subjects in the metal castings industry involve sand, and the side that wants to improve current, standard processes and the side that wants to extend the use of newly developed methods both raised their voices in the sessions of the Sand Division. The session devoted to three papers on the CO_2 process attracted an audience of over 500, largest at any technical session.

Evaluating Cereal Core Binders, E. C. Zuppann and H. Putz, Oliver Corp., South Bend, Ind. In applying the jolt-overhang test to an evaluation of the green properties of cereal core binders Zuppan and Putz found a correlation between the personal preference of the workman and the test, however they recommend that the jolt—overhang test be substituted in making an evaluation.

Some Considerations on the Tensile and Transverse Strength Testing of Shell Mold and Core Sands. P. J. Ahearn and F. Quigley, Watertown Arsenal; and J. I. Bluhm, and J. F. Wallace, Case Institute of Technology, Cleveland. Mechanical features of the baked tensile test

Author and wheels at Brass and Bronze session were: T. E. Gregory, secretary; G. H. Bradshaw, vice-chairman; and N. P. Hehmer, the author.

that appeared to affect the reproducibility of the results caused the authors to investigate new methods. The current standard test briquet was tested while held in steel clips designed to fit around the end of the specimen, but best results came with a redesigned briquet. Tests give higher tensile strengths with no loss of reproducibility. Five-inch radius supports ibility. Five-inch radius supports were used for transverse testing to reduce stress concentration and cutting of specimens.

Some Observations on the Transverse Test at Elevated Temperatures for Molded Sand Mixtures, D. C. Williams, Ohio State University, Columbus, Ohio. Plastic flow in sand mixtures can be studied through the use of the transverse test, although this particular test is rarely employed in the metal castings industry. Professor Williams presented his experience in using the test and the data accumulated in making them.

Molding Sands, Molding Methods, and Casting Dimensions, R. W. Heine, University of Wisconsin. The claims being made for new molding processes made it worthwhile for Professor Heine to take a look at an old process, green sand. He has drawn the following conclusions for the control of green sand casting dimensions: sand should have uniform and reasonably high relative density; sand requires high green strength hardness, and high initial desity; use a deep flask; sand should have optimum response to jolting and squeezing; pattern should be of good quality; sand should be molded at the lowest possible moisture content. (Preprint 56-151).

Does Sand Testing Give Us the Facts? R. W. Heine, University of Wisconsin; E. H. King and J. S. Schumacher, Hill & Griffith Co., Cincinnati, Ohio. Tests indicate that the standard 14 lb-2.0 in. ram does not produce a molding condition comparable to that of the jolt-squeeze machine, and should not be used for correlation of sand properties in the laboratory and in the foundry. The two- and four-pound weights with 2.0 in drop are recommended, to better correlate foundry results with laboratory control data. (MODERN CASTINGS, January, page 30 and Preprint 56-152).

New Test for Sand, R. W. Heine, University of Wisconsin; E. H. King and J. S. Schumacher, Hill & Griffith Co., Cincinnati, Ohio. The best molding sand, the best molding machine and the best molding practices for your job—these are facts that can be determined by a sand test that does give the facts: the jolt test for molding sands and molding machines. (MODERN CASTINGS, April, page 78.

Cold Process for Resin-Coated

What sand mixture shall I use? The men with the answers at the Sand Shop Course were, left to right, C. A. Sanders, moderator; H. W. Meyer, panelist; R. L. Cleland, chairman; and panelists R. F. Meader and W. G. Parker.

Foundry Sands, J. E. Bolt, General Electric Co., Pittsfield, Mass. The cold process for resin coating foundry sands is a notable improvement over the conventional dry sand-resin mixture from the aspects of resin economy, less dust, and ability to blow shells and cores without resin segregation. Within the next few years, resin-coated sands are expected to replace almost entirely the presently used dry sand-resin mixtures. Complete adoption of resin-coated sands by a foundry could allow for a single centralized sand coating station with pneumatic conveyance of the coated sand to needed stations and without danger of resin segregation. However, the process has a multitude of variables.

Developments of High Pressure Molding with CO_2 Process Sands, T. E. Barlow, Eastern Clay Products Department, International Minerals & Chemical Corp. Shells can be used for precision portions only of a green sand mold and it is quite feasible to have part of the mold in green sand and part in shell. The method has versatility and can use conventional equipment.

Factors Affecting Core Stickiness (progress report of Sand Division Committee 8-c-f). Don Mills of the Process Development Section of General Motors discussed the factors affecting core stickiness and said that the committee's first problem was to evaluate what was meant by stickiness. Procedure was to blow 20 cores and after each fifth core to brush out the sand and weigh it. Sand adhering to the core box tends to be concentrated beneath blow holes. Main objective of the experiments were to devise tests to measure stickiness. It was concluded that all test cores should be blown and not reamed. Lower moisture tends to give less stickiness. In varying the core oil it was found that after a period the core box seems to become lubricated but later the stickiness builds up again.

New Developments in Core Blowing, Arthur M. Clark, Ford Motor Co., Dearborn, Mich. Mr. Clark outlined the fundamentals of core blowing and shooting and the equipment used. Reviewing shortcomings in present core blowing technology, he said the industry must work toward a reduction in skilled core makers, in physical effort, in initial investment, and in maintenance costs. Improvements must be made in dimensional control and in flexibility of equipment.

We must work toward an increase in production per man hour, Clark declared. He challenged equipment manufacturers to work toward bringing about these changes, pointing out that in too many cases, research in development of new machines has been left up to the foundries. (Full story will appear in MODERN CASTINGS.)

Green-Sand Casting Finish, R. F. Meader, Whitin Machine Works, Whitinsville, Mass. Competition forces green sand foundries to produce better casting finish if they are to retain their business, according to Meader. He cited grain size as the most important factor governing surface finish and recommended the use of the finest sand permitted by the permeability need for the section thickness involved and the moisture content of the sand. (Preprint 56-156.)

Statistical Techniques for Classifying Foundry Sands, D. C. Ekey and John Leaman, Lebanon Steel Foundry, Lebanon, Pa. The mathematical approach to the sand problem was fully outlined by Leaman.

Analysis of Factors Affecting Surface Finish of Gray Iron Castings, D. C. Ekey and R. L. Yard, Lebanon Steel Foundry, Lebanon, Pa. A statistical survey and mathematical evaluation of the various factors having an effect on the surface finish of gray iron castings was presented by Yard.

The Carbon-Dioxide Process, D. V. Atterton, Foundry Services, Ltd., Birmingham, England. Official exchange paper from the Institute of British Foundrymen. In opening his presentation of a survey of the technical and practical developments of the carbon-dioxide process in Great Britain, Atterton stated that the actual advantages of the process depend on a number of variables. These include: the type of metal being cast, size of casting being produced, limitations on output, and on various local factors such as the availability of skilled labor. (Preprint 56-162).

Core Making with CO_2 Process, F. M. Scaggs, Oklahoma Steel Castings Co., Tulsa, Okla. When the experiments reported by Scaggs were started, his company was using approximately 70 per cent green sand cores and the remainder dry bond cores. The experiments were started in the hopes of reducing handling and breakage costs and of reducing the overall cost by reducing man hours required for core production. After 12 months study, Scaggs reported that he felt that there are many advantages for the process. (Preprint 56-164).

Progress Report of Core Test Committee (8-C). The committee has obtained data from 30 foundries that have used the CO_2 process and has compiled the results and experiences of these plants. Most foundries reporting were jobbing foundries with some semi-production plants. No high rate of production of cores or molds by the process was reported. Production included 26 different castings: five steel, nine gray iron, four malleable, four brass and bronze, three aluminum, and one nickel.

What Sand Mixture Shall I Use, Panel members were: H. W. Meyer, General Steel Castings Corp., Granite City, Ill.; R. F. Meader, Whitin Machine Works, Whitinsville, Mass.; and W. G. Parker, General Electric Co., Elmira, N. Y. The Shop Course panel discussion under the direction of moderator C. A. Sander covered a wide range of topics, including: selection of molding equipment to obtain close casting tolerances, shot blasting of castings and its effect on tolerances, total deformation of sand mixtures and its effect on casting tolerances, penetration, use of reclaimed sand, and flowability and its effect on casting finish.

Eliminating Sand Pile Blues, Panel members were: Ray Olson, Shell Process Inc., Chicopee, Mass.; Charles W. Mooney, Jr., Olney Foundry, Link Belt Co., Philadelphia; and Edward H. Berry, Dodge Steel Co., Philadelphia. The panel presented answers to questions that included the following: how do pro-

duction demands determine the type of equipment to be used for close tolerance castings, how much closer could green sand tolerances be if supervision was better, how does ferrostatic pressure affect casting finish, and how do gating and risering affect finish?

Influence of Sand Distribution and Surface Coatings on Metal Penetration, AFS Mold Surface Committee (8-H). The 1956 report of the committee reviewed its expanded study of gray iron penetration which, they reported, was expanded to include three basic types of non-proprietary core washes and several blends of sand for core specimens. (Preprint 56-186).

Casting Finish, Precision and Tolerance, C. A. Sanders, American Colloid Co., Chicago, Ill. Sanders appealed for better finish on sand castings and reviews the means of producing better finish in a discussion that he opened with the remark, "Many castings are sold by eye sight alone. If the surface finish does not appeal to the buyer, the physical properties of the castings certainly may not appeal to him."

Refractories

▪ The value of experimentation and the possibilities of finding a refractory that will do the job at a lower cost were the fundamental points made at the Refractory session.

Properties of Refractories Affect Air Furnace Bottom Service. L. R. Jenkins, Wagner Malleable Iron Co., Decatur, Ill. Reduction in use of refractory material in this study established the desirability of trying different types of refractories. The need for the development of an inexpensive means of testing brick was pointed out, and the author stated his opinion that minor impurities in high purity aluminum brick causes some premature failures.

Experiences with Basic Cupola Refractories and Melting. A. P. Alexander and Edward Boywid, International Harvester Co., Memphis, Tenn. In this study of the problems and advantages of basic melting the main disadvantages was determined to be the cost of the refractory material. The principal advantage was found to be lower iron cost when the scrap price is favorable.

Steel

▪ Hot tears, gases, and other subjects bearing of defective castings shared the Steel spotlight along the Ceramicast process, shell process, and a new idea for reducing grinding and finishing costs.

Effects of Aluminum and Titanium Deoxidation on Cast Steel. R. D. Ahles, W. R. Nestle, C. H. Weight, and R. S. Zeno, General Electric Co., Schenectady, N. Y. Interest in production of parts for turbines stimulated this research which covered the effect of aluminum on the mechanical properties of alloy steels and the effects of titanium. The authors noted that it is possible to increase the hardenability of steel while ridding it of pin holes when the sulphur content is under close control.

Hot Tearing Characteristics of Acid and Basic Steel Castings Determined by High Temperature Testing. C. F. Christopher, Continental Foundry & Machine Div., Blaw-Knox Co., East Chicago, Ind. Results of 1200 tests of the high temperature dynamic properties of a series of steels showed that all steels exhibit a limited brittle zone under the solidus which is related to the carbon content. The author concludes that hot tearing can occur only during the time when liquid is present at the grain boundaries of the metal.

Some Aspects of Dust Suppression in Foundries, C. M. Stoch, British Steel Castings Research Association, Sheffield, England. Dust suppression by dust prevention and control, and current research projects in industrial health problems were reviewed for this Steel session by the British visitor.

Eliminate Grinding—Lower Cost of Cleaning Operations, F. Newberry, Oklahoma Steel Castings Co., Tulsa, Okla. Carbon arc-compressed air pad washing has reduced grinding and cleaning costs in the finishing department of the author's plant. Data indicates that metal is removed approximately 20 per cent faster than by swing frame grinding. At the same time the operator can do a better job of holding the contour of the casting. (MODERN CASTINGS, May, page 121.)

Inorganic Binders Solve Shell Molding Problems, Jose Navarro and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass. Casting of low-carbon steel in shells was studied with a view toward lowering mold cost, improving gating and risering, and producing a smoother cast surface. Changing rigging, gating, and risering did, in some cases, eliminate surface defects.

Some improvement was achieved on 1-in. thick slabs by top pouring slowly. Carbonate additions to sand-resin mixtures improved surface finish of plate castings up to ½-in. thick. Heavier sections required, in addition, that forsterite or zircon be substitute for silica sand. To develop a shell mold that would not evolve gas, a mixture of sodium silicate, water, and sand was blown on a hot pattern. Steel castings made in these shells were free of surface defects. (Preprint 56-175).

Anionic or Cationic Agents—A Solution to Sand Problems, G. J. Vingas and A. H. Lewis, Dominion Engineering Works, Montrea, Que. Variations in the rate of surface drying of green molds made of bentonite bonded sands were found to be due to variations in the rate of moisture migration in the sand. Unfavorable drying effects, notably in synthetic sands (particularly when made with reclaimed sand) can be overcome by the addition of anionic or cationic surface active agents with a resulting overall improvement in the sand. Variations in drying tendency were traced to hydrogen ions and a high pH was found to minimize the tendency.

Bentonite—Properties and Composition (Their Relation to Casting Defects), W. D. Emmett, Los Angeles Steel Castings Co., Los Angeles, Cal. Presented by B. G. Emmett. In his description of pH control in a steel foundry, Emmett stated that he did not believe that a new sand with a bentonite with a pH test of 8 to 9, and a settling test of not less than 20 seconds, can be improved by altering the pH factor.

Joint Gray Iron-Malleable Round Table lunchers were: standing, B. C. Yearly, C. K. Donoho; seated, co-authors F. B. Rote and E. J. Chojnowski.

Removal of Gases from Molten Steel, Clyde H. Wyman, Burnside Steel Foundry Co., Chicago, Ill. Wyman, chairman of the AFS Steel Division Research Committee, presented a preliminary progress report of the committee's investigation into the effects of introducing gases and solid deoxidation products under pressure into molten steel.

Ceramicast Process for Steel Castings, D. C. Ekey and E. G. Vogel, Lebanon Steel Foundry, Lebanon, Pa. A year of production use of the Ceramicast process has shown this foundry that it is a means of producing precision castings at low cost on runs of less than 500 castings. Castings of thin section down to 1/16 in. with surface finish of 125 micro-inches and better is claimed by Ekey and Vogel. (MODERN CASTINGS, May, Page 116).

What's New with Snotters – and Other Steel Foundry Problems, The Steel Round Table Luncheon featured a panel discussion of ticklish problems by a panel consisting of C. A. Sanders, American Colloid Co., Chicago; H. H. Blosjo, Minneapolis Electric Steel Castings Co.; and J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind.

Ventilation

■ The Ventilation session produced two views of the subject of ventilation and of its associated problems.

Foundry Ventilation, J. G. Liskow, American Air Filter Co., Louisville, Ky. Liskow presented the twofold benefits of ventilation: safeguarding human health and safeguarding vital machinery by avoiding damage caused by abrasive dust. Liskow reviewed the approved means of providing adequate foundry ventilation and refered to the newly-published AFS engineering manual which details the subject.

Aluminum Therapy, J. W. G. Hannon, McIntyre Research Foundation. Hannon presented a description of how silicosis develops in the lungs and how aluminum therapy is used with persons suffering from silicosis.

Controlling Foundry Air Pollution

■ Today air pollution is associated with contamination of the air by natural phenomena and human activity. Industrial plants are only one source of such pollutants. Residential heating stacks, dust storms, decaying vegetation, traffic-generated dust and fumes, trash and garbage handling and disposal account for a measurable amount of air-borne contaminants. In most cases industry has cooperated in trying to reduce the discharge of pollutants into the air and streams, but in most cities industry's corrective efforts have accomplished little because the burning of fuel, trash, and the use of automobiles, etc., by the public, continue to contaminate the air.

The need of better relations between industry and its adjoining community cannot be overemphasized. In a few cases the failure by industry's management to make a sincere effort to eliminate any of the air contamination problems has resulted in a crusade within the community against all industry in its area, to eliminate pollution of the air. Better relationship through education of the public to the specific problems will prevent the ill feelings that may exist whether the demands of the public have been fulfilled or not. Management's indifference and lack of education of the public may lead to the enactment of unrealistic control ordinances detrimental to the best interests of industry and the community.

In many communities over-all air pollution controls have already been established. Here the technological requirements and limitations have already been defined. Foundry operators in these communities should study the most economical and best method of solving their air contamination problem to meet code requirements. In other areas where codes do not exist the foundry operators should be well informed as to available control methods so that the adjoining communities can be made aware of the magnitude of air pollution control.

In the eyes of the public the foundry industry is a major source of air pollution. Actually when we compare the foundry industry with many basic industries we find that the equipment needed to reduce pollution of the air by contaminants from the foundry is less extensive. Collectors that collect material from grinding, cleaning, material handling, shakeouts, etc., have been in use for years by most foundries.

It is recommended that foundrymen study and understand the undesirable effects that air pollution can cause on man and animals as well as on the surrounding areas.

■ **Effect on Man.** In only a few isolated cases such as the Meuse Valley of Belgium in 1930, Donora, Pa., in 1948, and more recently the London fog has air pollution by industrial wastes been blamed for deaths among people. In many cases the deceased were already afflicted with a respiratory disease or other physiological complications. Rare indeed is the combination of topographical and meteorological conditions which permit the accumulation of sufficient pollution to produce a demonstrable effect.

The systemic effect on man of more normally encountered types of air pollution has not been demonstrated. However, there can be instances where stack emissions contain toxic materials that must be evaluated with the same procedure used in in-plant industrial hygiene.

Ranging from the reduction of ultraviolet light from the sun due to hazy atmospheres on up to chronic inflammation of the eyes, mucous membranes and respiratory system, the effects on man of air pollution will vary according to the specific reaction of the individual and degree of pollution; to date, results of surveys in polluted areas have been inconclusive insofar as health effects are concerned. This is borne out by the refusal of most courts to consider health injury in litigation involving air pollution. In these cases, the tendency has been to evaluate the pollution from the strictly nuisance viewpoint.

■ **Effect on Animals.** Foundry emissions contain no known contaminants in concentrations which affect the well-being of domestic animals.

■ **Effects on Vegetation.** While the growing of rare or exotic plants in the immediate vicinity of a foundry has been shown to be unwise, instances of crop damage traceable to foundry operation have not been substantiated. As a district becomes industrialized, the surrounding agricultural land becomes less and less suitable for its original purpose. In some cases, the value of the land becomes so great due to nearby industrialization that it becomes uneconomical to continue to raise crops on it. Other problems which affect the growing of crops in areas surrounding industrial districts include stream pollution and the "poisoning" of soil by seepage from settling basins, etc.

■ **Effects on Property.** The estimated annual cost of corrosion in large industrial cities is tremendous; however, such corrosion comes from sulphur dioxide and other acids in the atmosphere emitted by industrial plants and also from all types of buildings such as homes, shops, churches, hotels, schools, and the like, employing heating equipment which burns sulphur bearing fuel. Industry alone cannot be held responsible for corrosion due to air pollution. It is true, however, that there is apt to be more corrosion in areas in the immediate vicinity of plants which use large amounts of fuel in which gases containing sulphur compounds are discharged to air.

With respect to solid air contaminants, it is necessary to differentiate between the emission of coarse solid particles which create a nuisance in the immediate vicinity of the plant and the emission of extremely fine solid particles or fumes which can be carried for miles by prevailing winds without settling. The former instance may be termed "local nuisance" and often results in a series of complaints from those whose laundry on the clothesline has been soiled by settling material, or from owners of cars parked in nearby lots, etc. Local nuisances resulting from the settling of coarse material discharged to atmosphere are the source of most neighborhood air pollution complaints and are the ones most easily corrected.

The effect of the fine material which is carried over large areas is debatable.

This introduction to the AFS ENGINEERING MANUAL FOR CONTROL OF EXTERIOR AIR POLLUTION BY FOUNDRIES indicates the scope of the publication. It will be released in the latter part of 1956.

The RIGHT WAY is the SAFE WAY

LEONARD COLE / *Safety Engineer*
Crane Co., Chicago

This is the clue to accident prevention; now your problem is to get everyone to use the safe way

■ There is a right way to do every job. If jobs are properly planned and are done the way they are supposed to be done, there will be no accidents. That, in short, is all there is to accident prevention—to get people to do their jobs in the right way.

The causes of an accident are always very definite. It may be an unsafe condition such as an inadequately guarded machine, a defective piece of equipment, or an unprotected dangerous area. It may be the improper work habits of a foundryman, or just poor housekeeping. So when an accident does occur, it is an indication that something has gone wrong, that someone failed to do his job in the right way, or that some unsafe condition existed. It is impossible to have an accident without one of these causes. It is just as impossible to take the proper steps to prevent future accidents until the responsible causes are known.

Supervisory personnel are expected to know all the hazards of foundry operations, both the obvious ones and those that may be brought out by inexperienced workmen. When assigned to a new job, however, the supervisor does not immediately know the accident record of his new section, or all its hazards. He can and should secure this knowledge from the Safety Division.

The foreman supervises the working personnel. It is his responsibility to tell them how the job is done safely, and why the "short cuts" should be avoided, especially in those areas where accidents are apt to be the most serious. But since employees are human, they may not remember everything they are told; and the foreman's further responsibility is to follow up instructions to see that they are complied with.

Many accidents are viewed as being of a minor nature. Because they are not serious, such accidents are taken for granted and not always regarded as accidents. But to the experienced foreman who realizes that serious accidents spring from the same causes as minor ones, they represent definite danger signals. He will correct little mistakes when he spots them, and will take a few minutes out each day to search out unsafe practices, cautioning em-

Metal in the mold, not on the man, is the function of safety equipment.

Avoid short cuts: especially if your hands hold the work on the saw.

ployees continually. This is real accident prevention.

When an accident does occur all the facts about it should be secured by the foreman. Very often the cause is written off as "carelessness." This is a meaningless expression unless the supervisor can determine exactly how the individual was careless. Naturally, any investigation should be conducted as soon after the accident as possible. Delay causes details to be forgotten. If possible, the employee involved should be interviewed. It is important to avoid any appearance of trying to fix blame. Facts, not opinions as to cause, should be sought, with the foreman and safety engineer arriving at conclusions.

In determining facts, it is necessary to check the circumstances. Would this be a practical thing to expect of an employee working all day? What did he do that was unusual? Did fellow workers create an unsafe condition for the man involved? Was there an unsafe condition at all? Quite often the final question will be "Why on earth did he do that?" Discovering the unsafe conditions and understanding the "why" of actions will help in discovering similar traits in other workers.

Corrective action is the most important step; regardless of all the good intentions and all the data, something definite must be done to control actions or eliminate hazardous conditions if any progress is to be made in the field of accident prevention.

Corrective action—the process of getting things done—can be taken on four fronts.

There are mechanical means. We can eliminate the condition or change the procedure. We can repair or replace broken or defective parts, or install a guard on a dangerous piece of machinery.

We can also eliminate some causes by assigning people to some other kind of work. Some people are affected by odors, intense light, extremes of temperature or noise. Others become nervous and move in contrary patterns when they have to work in a congested area.

Disciplinary measures can be applied, but only as a last resort when other methods have failed. As in everything else, there is a right way and a wrong way to deliver a reprimand. If the foreman first makes sure a reprimand is deserved, delivers it in private, adjusts his approach to the individual, and gives the man a chance to tell his story, the chances of success are infinitely improved.

But for the human element, the method of instruction and appeal offers the best approach. If employees are not following instructions, we should find out why. In some cases it is a matter of absentmindedness, recklessness, nervousness, or a wilful disregard for instruction. In other cases, we may find a lack of understanding. The employee may simply not be convinced that his method is not safe. At other times some physical deficiency may be preventing the man from following instructions. In any event, it is generally possible to find some clue to the non-compliance.

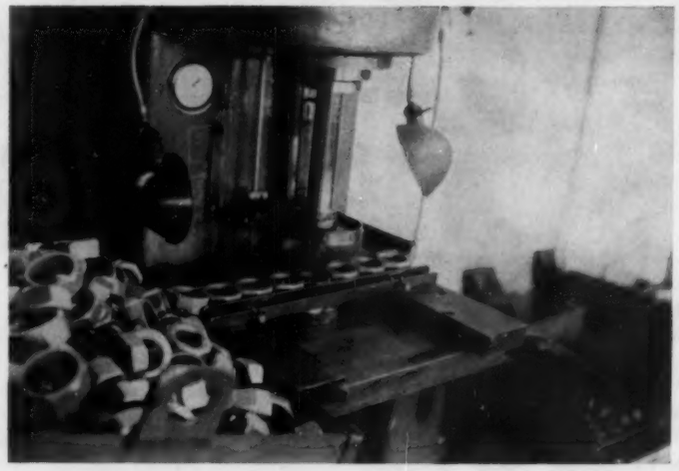
In such an investigation, it may become apparent that the supervisor is partly at fault. He may not have given safety instructions with the same enthusiasm and determination he gave to production orders, or exhibited no active interest in accident prevention, or failed to point out the importance of the worker's job to the finished product. Perhaps he has previously ignored violations of the same instructions he is currently trying to enforce, or been guilty of the same violations, or been impartial or unreasonable. Any of these things is frequently the answer to non-compliance from the workers.

The foreman always has available the use of motivating characteristics that frequently move people when other means fail. Pride, for example; men like recognition for their good work, and can be shown that improper methods could spoil their work and hamper their production efforts. Fear of injury, ridicule, censure, loss of pay, or loss of opportunity will affect other men Other employees will respond through their desire to cooperate, their liking to reason out a problem, their interest in new ideas. This last device gives the opportunity of talking it out with men, asking for ideas on how to overcome some of the objections raised to safety procedures.

Condensed from the talk *"How to Be Happy"* given at a meeting of the Twin-City Chapter, American Foundrymen's Society, by Leonard Cole, Crane Co., Chicago.

Now There's An Idea

Plastic Guards Pressman's Hands



■ It's a hazardous job forcing a ram die into the cylindrical portion of nut castings in preparation for threading.

At Erie Malleable Iron Co., Erie, Pa., nut castings used to be placed into position under the ram by the left hand and removed with the right. Wrong timing of hands, or foot on foot treadle and the ram could have cut off a finger.

A simple guided path or chute extending from one side of the press table to the other and passing directly under the ram greatly reduces hand operations.

Placing nuts into the chute with the left hand is now a much shorter and less exacting operation. When another casting is added to the chute the column is indexed, discharging a pressed nut and bringing another into pressing position. The right hand is used at the discharge end merely to steady the line of castings.

To eliminate the possibility of getting hands in the way of the ram and yet to allow visual positioning of castings under the ram a plastic shield enclosing the full path of the ram was attached to the press column.

Thanks to F. J. Renaud, press and shipping department foreman who proposed and developed these safety features, it is not only unnecessary but also impossible to hazard hands in this operation. *G. P. Covert, Personnel Director, Erie Malleable Iron Co.*

SFSA Safety Contest

■ The 1956 National Steel Foundry safety contest sponsored by the Steel Founders' Society of America for all foundries making steel castings will begin June 1 and extend through July and August.

Competing foundries are grouped according to the total exposure man-hours of their employees. The rules of the American Standards Association will apply in determination of lost time injury frequency rates.

Each year several foundries in the contest receive a "Highest Honor Safety Award" certificate for maintaining an accident-free record during the contest. A "Certificate of Safety Achievement" is awarded each foundry with a frequency rate of 10.0 or less and "Honorable Mention" for substantial improvement.

Contest regulations and information are available from the Safety Committee, SFSA, 606 Terminal Tower, Cleveland 13, Ohio.

Non-Ferrous Founders Study Cost Systems And Purchasing Problems

NFFS annual dinner head table had seated, left to right, Wm. L. Leopold, retiring president, E. J. Metzger, incoming president, C. J. Egetter, vice-president, and P. E. Lankford, 2nd vice-president. Standing are G. T. Fischer, director, H. A. White, immediate past president, Julius Kass, principal speaker, and W. B. Wilkins, master of ceremonies and past president.

Surprise of the evening was silver plate presentation to James W. Wolfe (left), NFFS executive secretary, by Wm. A. Messner of BDSA, representing "friends in Washington." At right, Wm. L. Leopold holds president's plaque presented in recognition of his service to NFFS by H. A. White.

■ Quality, delivery, and price are the major considerations in purchasing, two large buyers of non-ferrous castings said at a lunch held in conjunction with the annual meeting of the Non-Ferrous Founders' Society. In addition to the purchasing practices panel, the meeting featured committee reports, elections, a discussion of cost systems, reports from BDSA, and the annual dinner. All sessions were held May 3 in the Marlborough-Blenheim Hotel, Atlantic City. NFFS President Wm. L. Leopold, Northern Bronze Corp.

Surprise of the meeting was presentation at the annual dinner of a silver plate to James W. Wolfe, executive secretary of NFFS. In presenting the plate, Wm. A. Messner, Jr., Copper Div., BDSA, stated that it came from Wolfe's Washington, D. C., friends as a token of their esteem for him and his work and constant efforts on behalf of NFFS and all non-ferrous foundrymen.

A president's plaque for his services as top administrative officer of NFFS was presented to Mr. Leopold by H. A. White, Smeeth-Harwood Co.

New officers and directors announced at the annual dinner were: E. J. Metzger, Multi-Cast Corp., president; C. J. Egetter, Crown Brass Mfg. Co., first vice-president; P. E. Lankford, East Birmingham Bronze Foundry Co., second vice-president; and directors: H. D. Fishel, Arrow-Acme Corp., M. E. Nevins, Wisconsin Centrifugal Foundry, E. J. Metzger, K. R. Proud, Anstice Co., D. E. Broggi, Neptune Meter Co., and W. J. Meakin, R. B. Carolin Foundry & Machine Co. Messrs. Fishel and Broggi are new board members.

Watson B. Wilkins, American Manganese Bronze Co., was master of ceremonies at the dinner. Principal speaker was Julius Kass.

At the luncheon, sponsored jointly by the Non-Ferrous Founders' Society and the American Foundrymen's Society, E. J. Schwarz, DeLaval Steam Turbine Co., and George W. Partington, General Electric Co., gave their views on what the castings buyer expects from the foundryman. W. A. Gluntz, Gluntz Brass & Aluminum Co., presided with George T. Fischer, Fischer Casting Co., as co-chairman.

Pointing out that he purchases over $900,000 worth of bronze castings annually, Mr. Schwarz said vendors are selected on the basis of quality, delivery, and price. Perforuance of suppliers is measured and reported to them monthly. A detailed rejection slip was used in case of rejected castings, he said. In the case of returned castings, his company billed back the shipped weight of the castings, he stated.

Quality and type of pattern being big factors in the ability of a shop to meet customer demands, Schwarz said, the foundry should point out shortcomings in patterns promptly, not use them as an excuse if unable to deliver later.

Mr. Partington said his company requests bids on a per piece, not per pound, basis, and judges foundry performance on quality (40 percent), delivery (35 percent), and price (25 percent). Castings vendors are asked to quote on pattern equipment to avoid divided responsibility, he stated. Vendors are asked to quote prices on basis of current metal market, then prices are adjusted as market varies.

With production of domestic refined copper expected to increase, the supply should be in approximate balance with demand in the current quarter, Wm. A. Meissner, Jr., Copper Div., BDSA, said in reviewing past activities of his division and the outlook for the future.

Outlook for aluminum for the next five years is nothing but encouraging, John H. Styer, Aluminum & Magnesium Div., BDSA said.

Speaking on the importance of knowing costs, John Carter, cost consultant, noted that when he was in OPA he observed that foundries with the best cost systems had the highest profits.

Floor discussion brought out that shops with good cost systems get more business and at prices that pay off. Under price control this type of shop got along best.

Purchasing panel was, left to right, George W. Partington, General Electric Co., G. T. Fischer, Fischer Casting Co., W. A. Gluntz, Gluntz Brass & Aluminum Co., and E. J. Schwarz, DeLaval Steam Turbine Co.

continued from page 90

MANUAL FOR CONTROL OF IN-PLANT ENVIRONMENT IN FOUNDRIES.

Section 8. The information on dust control at foundry shakeouts is based on sound engineering principles and a proper analysis of the problem as it obtains during actual operating conditions.

The section is divided into five parts as follows:

1. Site evaluation of shakeout ventilating systems
2. Thermal currents produced by castings
3. General air movement and cross drafts
4. Design of side-draft hoods
5. Prediction of exhaust air volumes to obtain specified air velocities over the shakeout grate
6. Design of the shakeout system

The book constitutes a worthwhile contribution to the field of foundry dust control.

Published by British Steel Castings Research Association, Broomgrove Lodge, Sheffield 10. 7-1/2 x 10, 98 p, $7.00, post paid. — *H. J. Weber, safety, hygiene, and air pollution control director AFS.*

Request AFS Chapters to Name Nominating Committee Candidates

Eligible chapters of the American Foundrymen's Society have been asked by Wm. W. Maloney, AFS general manager, to forward the names of two candidates for possible appointment to the 1956-57 Nominating Committee of the Society by July 1. Chapters eligible are those who have not had a member on the past two national Nominating Committees according to the AFS By-Laws. Chairmen of these chapters have been notified by mail. Prompt action is urged.

From the list of committee candidates, the Executive Committee will select five, one to represent each of the five regions of AFS. These, along with the last two living past-presidents will form the Nominating Committee.

Paul L. Arnold

Thomas Rutherford

National Castings Council representatives who stayed for lunch heard Roger F. Waindle of BDSA on the Castings Branch of the Iron & Steel Div. Seated are: C. R. Heller, D. E. Davidson, W. O. Larson, F. R. Fleig, Wm. L. Leopold, Mr. Waindle, F. G. Steinbach, C. T. Sheehan, and V. S. Lazzara. Standing are: H. F. Scobie, J. W. Wolfe, D. H. Workman, H. A. White, E. J. Aubuchon, G. E. Seavoy, H. F. Park, J. H. Smith, E. J. Walsh, G. K. Dreh er, G. D. Shrum, L. D. Ryan, and K. E. Donaldson.

CASTINGS CONGRESS
Not Just an AFS Meeting

At FEF Trustees meeting were: H. A. Forsberg, T. T. Lloyd, F. G. Steinbach, C. W. McLennan, P. E. Rentschler, C. L. Pinkston, and C. H. Martin. Standing are: L. H. Durdin, E. C. Hoenicke, H. A. White, E. J. Walsh, J. H. Smith, G. K. Dreher, K. E. Lange, C. V. Nass, O. J. Myers, and C. E. Brust.

The five foundry organizations below had booths at this year's AFS Castings Congress as a convenience for members.

■ Among foundry organizations which held meetings at this year's AFS Castings Congress were the National Castings Council, the Non-Ferrous Founders' Society (page 99), and the Foundry Educational Foundation.

At the NCC annual meeting, President Wm. L. Leopold, also president of NFFS, presided over a session that included a talk on government-industry liaison and defense planning activities of the Business and Defense Services Administration by Roger R. Waindle, head of the Castings Branch of the Iron & Steel Div. Frank G. Steinbach, NCC secretary and editor of *Foundry*, spoke briefly on the founding of the council 10 years ago, pointing out that the group provides an atmosphere conductive to joint action and cooperation among the 11 member organizations.

Paul L. Arnold, president of National Foundry Association, was elected president of NCC. Thomas Rutherford, president of Alloy Casting Institute, was named vice-president. F. Ray Fleig, Foundry Facings Manufacturers' Association, continues as treasurer, with Mr. Steinebach continuing as secretary.

A F S Installs New England Chapter

The New England Chapter of the American Foundrymen's Society was installed in Boston April 1. Known as the New England Foundrymen's Association since 1895, the group becomes the 45th industrial chapter of the society.

Officers of the new chapter are: Albert M. Nutter, *president;* Clyde Armstrong, *vice-president;* and Thomas I. Curtin, Jr., *secretary-treasurer.* These officers are the former officers of New England Foundrymen's Association.

Albert M. Nutter, president of the new chapter, accepts gift that symbolizes creation of the society's newest chapter from Wm. W. Maloney of AFS.

Unwrapped gift proves to be a rattle for "baby" chapter.

Vice-President Shipley of AFS reflects during welcoming talk as listeners Wm. Ohlson and Alexander Beck ponder, too.

School Days Again for Foundry Teachers

■ Teachers of foundry practice and patternmaking in vocational and high schools will study the needs and the growth of the metal castings industry during an American Foundrymen's Society-sponsored seminar to be held at the Kellogg Center of Michigan State University, East Lansing, Mich., June 14-16.

About 120 instructors from Michigan, Ohio, Illinois, Indiana and Wisconsin will attend the seminar at the expense of AFS. The number of instructors invited to attend this seminar, first of its kind ever held, is limited by the facilities available. However, A. B. Sinnett, AFS education program director, indicates that the program may be extended in the future.

The announced program for the 1956 Foundry Instructors Seminar follows:

Thursday, June 14

8:30 am . . Registration.
9:30 am . . *Welcome.* H. W. Dietert, vice-president, AFS.
9:35 am . . *Progress in the Metal Castings Industry.* H. J. Heine, technical director, AFS.
10:45 am . . *Training Needs of the Foundry Industry.* Fred G. Sefing, International Nickle Co., New York.
2:00 pm . . *University Training of Engineers for Foundry Work.* C. C. Singerfoos, Michigan State University.
2:45 pm . . *In-Plant Training of Foundry Personnel,* B. L. Bevis, Caterpillar Tractor Co., Peoria, Ill.
3:45 pm . . *The AFS Apprentice Contests.* A B. Sinnett, education program director, AFS.
4:00 pm . . Inspection trip to Saginaw Malleable Iron Plant, General Motors Corp.

Friday, June 15

9:00 am . . *Planning and Equipping the School Foundry.* A panel discussion.
10:30 am . . *Foundry Safety and Community Relations.* Herbert J. Weber, director, safety, hygiene and air pollution control program, AFS.
11:15 am . . *The Work of AFS in the Castings Industry.* Wm. W. Maloney, general manager, AFS.
12:00 . . LUNCHEON. *Effect of Automation on Industrial Employment.* Prof. Richard Sullivan, University of Wisconsin.
2:00 pm . . *Availability and Use of Instructional Materials.* A panel discussion.
3:30 pm . . *Coordination of the School Program and Industry.* R. A. Oster, Beloit Vocational and Adult School, Beloit, Wis.
6:00 pm . . DINNER. *The Future of Vocational Education for Industry.* Dr. C. L. Greiber, past president, American Vocational Association.

Saturday, June 16

8:30 am . . *Development of a Foundry Course to Meet the Needs of Local Foundry Industry:*
1. *The Foundry Course in a General Shop Program.* J. A. Fuzak, Michigan State University.
2. *The Foundry Course in a Vocational Program.* Frank C. Cech, Cleveland Trade School, Cleveland, O.

10:30 am . . Question period.
11:30 am . . Adjournment of seminar.
11:45 am . . Luncheon.
1:30 pm . . Open house in MSU foundry laboratories.

A F S Technical Committees Attack New Problems

■ Broadening areas of technical activities now underway under the auspices of the American Foundrymen's Society are indicated by the recent activities of two AFS groups.

A new Radiation Protection Committee, a part of the AFS safety, hygiene and air pollution control program, held its second meeting in Chicago recently and completed an outline for a manual on radiation protection which the committee will write.

At this meeting, the committee appointed Floyd Van Atta, research director, National Safety Council, as chairman of the group and named Craig Roberts of the AEC as vice-chairman.

In preparing their manual, the committee will consider such information as: isotope handling, shielding, emergency procedures and first aid.

The Steel Division Research Committee met at AFS headquarters in Des Plaines, Ill., to discuss further work on its studies in gas flushing of molten steel and to discuss snotters.

The committee reviewed the comments by S. L. Gertsman on his studies in gas flushing at the Department of Mines and Technical Surveys, Ottawa, Canada, and decided to repeat its own experiments at the Burnside Steel Foundry, Chicago.

Sample castings with snotter defects on the casting surface were examined by the committee members. The committee has recommended that a research project on the cause and formation of snotters be undertaken by the society.

Steel research committee looks at surface defects on steel castings. Committee members, left to right, J. E. Foster, AFS; C. H. Wyman, Burnside Steel Foundry Co., chairman; H. H. Blosjo, Minneapolis Electric Steel Castings Co.; H. J. Heine, AFS; W. O. Igelman, National Malleable and Steel Castings Co.; C. H. Long, Battelle Memorial Institute; W. R. Punko, Wehr Steel.

Radiation protection problem probers are, left to right, William Rivkin, Tracerlab, Inc., R. F. Holste, General Electric Co.; H. J. Weber, AFS; Floyd Van Atta, National Safety Council, chairman; Craig Roberts, Atomic Energy Commission; Dr. Glen Gardiner, Inland Steel Co.; Floyd Sutherland, Continental Fdy. & Mach. Co.; Dr. M. H. Kronenberg, Caterpillar Tractor Co.

Malleable Founders Look to Larger Markets

■ Salesmen for foundries should understand more about their clients' problems and help to solve them, Roy Webb, purchasing agent for Templeton-Kenly Co., Broadview, Ill., told executives and sales personnel of the malleable castings industry at the 7th Market Development Conference of the Malleable Founders' Society. Meeting April 12 and 13 at the Edgewater Beach Hotel in Chicago, they heard Mr. Webb express the belief that more and more castings salesmen must be engineers and understand not only the properties of castings but how they are made, so they will be in a better position to trace down trouble.

"Although I am not a technical man and only know comparatively little about castings, I find salesmen calling on me who don't know as much as I do," Webb declared. "That's a poor commentary on their sales ability."

He also feels that salesmen should know the status of every job they have in process so they can answer questions put by their customers. "The salesman is often our only contact with the foundry," he said. "We have to judge the foundry by the salesmen we see." Webb led off the second day of the meeting which was devoted to the "outside" viewpoint.

In opening the conference the first day, MFS Vice-President Leon J. Wise, Chicago Malleable Castings Co., Chicago, said that the conference is intended to provide an annual supplement to the individual sales efforts of the various plants. Quoting from a message from Carl L. Liebau, Federal Malleable Co., West Allis, Wis., president of MFS, Mr. Wise said that the malleable industry is still not doing as much in marketing as it should to advance in accord with its potential.

The two-day program was chairmanned by James W. Hallock, Albion Malleable Iron Co., Albion, Mich.

The Malleable Founders' Society, started in 1896, is one of the oldest trade associations, Lowell D. Ryan, MFS managing director, explained in reviewing the organization's history and objectives. To promote the welfare of the industry is the purpose of MFS, he said, noting that the society would do anything within the scope of legality and the limitations of budget and staff on behalf of its members. Membership, he said, includes 55 of the 80 malleable producers of the United States. Practice is to keep members informed on all happenings of interest and importance to the malleable industry. Good cost finding procedures are of major importance, he stated.

The MFS advertising program has resulted in numerous requests for literature, Lloyd E. Young, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., said in reporting as chairman of the Advertising Committee. Ads emphasize cost reduction, toughness, and durability, he pointed out in reviewing blow-ups of the ads with the conference to secure ideas for improvement. He urged use of ad reprints as mailers, imprinted with the foundry trademark and company name, and enclosed with shop sales messages.

Conference Chairman Hallock, reporting as chairman of the Market Development Committee, stated that his committee carried out its work through a one-day sales clinic in the fall, the annual spring market development conference, through news releases and technical articles, and through market research. In addition, the committee will assume responsibility for distribution of the forthcoming malleable iron handbook, he said.

Mr. Hallock said per capita consumption of malleable in 1956 would be 12½ lb while in 1965 it was expected to be 13½ lb. Projected total shipments in 1965, based on current trends were 1,150,000 tons. Based on per capita consumption and population growth, predicted 1965 shipments were 1,250,000 tons. He warned malleable founders to be prepared to produce the increased requirements of tomorrow by planning for plant improvements and expansions. He also noted that producers must remain aware of possible design changes that may increase or decrease expected requirements.

Mark M. Miller, National Malleable & Steel Castings Co., Cleveland, reported for Harvey E. Steinhoff, Wagner Malleable Iron Co., Decatur, Ill., chairman of the Handbook Committee. The new handbook, to be out in 1957, is being developed along more promotional lines, with illustrations of the most modern

equipment and plant layouts, and expanded sections on pearlitic and on machinability, he said.

Malleable gating and feeding research being completed this year has led to techniques which enable malleable founders to markedly increase yield without reducing soundness, James H. Lansing, technical and research director of MFS announced. He cited yield improvements ranging from 5 to over 20 per cent (see Talk of the Industry, page 33). Malleable is expected to be accepted for use at temperatures up to 750 F, he said, in discussing future applications.

The Foundry Educational Foundation is helping sell castings continuously and profitably in several ways, E. J. Walsh, executive director of the Foundry Educational Foundation, Cleveland, stated. FEF reaches the fountainhead of buying influence by reaching tomorrow's management through contacts in top engineering schools, he said. Castings customers are hiring FEF graduates who go into plants as indoctrinated customers predisposed to consider castings as engineering material.

Mr. Ryan reported on a market survey conducted by the MFS staff among 77 manufacturers in an area not now served locally by a malleable shop. In commenting on surveys in general he cited as two difficulties in market research the possibility that demands may not follow population growth and the problem of determining whether persons queried are really potential customers.

The survey showed, Ryan stated, that (1) people were glad to talk, (2) the area was not well covered by malleable salesmen but that stamping and weldment producers were not doing a good sales job, (3) reaction to castings is generally favorable but little is known about pearlitic, (4) five plants were buying nodular iron because malleable was not available in the area. He recommended that malleable founders unable to serve a customer's needs should find another source of malleable castings for him.

"You" make the difference in salesmanship, William Gove, EMC Recording Co., St. Paul, Minn., said

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in his dinner address. He listed as guides to good salesmanship: be yourself, be a good listener and work together with the customer, and serve 'em to death. Be a go-giver as well as a go-getter, he advised.

First speaker the second day was Roy Webb who gave a purchasing agent's viewpoint of castings salesmen.

Elmer E. Braun, Central Foundry Div., General Motors Corp., and Thomas Seavy, Pontiac Motor Car Div., GMC, collaborated in describing the development of the pearlitic malleable crankshaft being cast in shell molds for Pontiac engines by Central Foundry Div. Braun described the production of the crankshaft in the foundry (full story soon in MODERN CASTINGS). Seavy outlined the machining steps undertaken in the Pontiac Plant, together with the savings over the forged crankshaft.

"Tomorrow's Foundry Products and Processes" were covered in a talk by A. W. Anderson, Manufacturing Research Dept., International Harvester Co., Chicago.

A major portion of the Friday session was taken up with a discussion of conversions of metal products to malleable castings. A number of specific cases were described by conference attendants. The session was led by Joe W. Beckham, Texas Foundries, Inc., Lufkin, Texas.

A Motion picture, *"Iron Ore in '54,"* portraying the development of new Canadian iron ore deposits, was also shown.

James Hallock and Lowell Ryan conducted the round-up of the sessions which closed the conference.

I understand you got the biggest collection in the place.

Deflation

There's a big electric furnace at the
far end of the floor,
And his brilliant light is blinding
when they open the door.
His appetite is hearty as they feed
his ponderous jaw.
And he changes steel to liquid in
his searing firey maw.

And as he eats, his roaring rumble
rises to a scream
And he casts, like a big projector,
a long and brilliant beam
Past cores and molds and facing box-
es, patterns stacked up high,
Outward to the dimmest corner; up-
ward to the sky.

A man who walks across the floor, un-
less he stoop and crawl,
Will willy-nilly have his shadow cast
upon the farthest wall.
A frail and puny mortal, caught with-
out intention
In the bright refected glory of his
genius and invention.
Be he big man or little, be he short
or tall,
A huge, formidable giant appears up-
on the wall.
The furnace could destroy him, hurl
him to disaster
And he roars with mirth at the grim
joke he has played upon his
master.

For the real man's in the furnace
beam, in his humble, lowly
station
The shadow pictures him in his own
lofty estimation.
Man—a product of this world—but an
earthy clod,
Beholds his ego magnified and
dreams himself a god.

Oh, thank you once for jarring us from
smug and staid tranquility,
And thanks, again, oh, Furnace, for
a lesson in humility.
A man feels mighty small—like he's
hardly there at all
When the big electric furnace casts
his shadow on the wall.

From *Rammed Up and Poured*, book of foundry poems by Bill Walkins, former sand mill operator, editor of *The ESCO Ladle* of Electric Foundry Co., Portland, Ore.

casting through the ages

Odd Bits

IN ANCIENT EGYPT, THE POTTER IT SEEMS, WAS THE CRAFTSMAN WHO COMPOUNDED CLAY FOR CRUCIBLES AND MADE THE MOLDS USED IN CASTING THE METAL PIECES WHICH CLOSELY RESEMBLED POTTERY OF THE ERA.

foundry trade news

Aluminum Company of America . . has announced start of construction work on a 150,000 ton smelting plant near Evansville, Ind. Company recently renamed its research facility the "Alcoa" Research Laboratories; a change from "Aluminum" Research Lab. Firm states that facility is world's most complete light metals research lab.

Shallway Corp. . . has installed a shell molding machine for pattern size 36 in. x 36 in. in the Ellwood City steel foundry of the National Tube Div. of U. S. Steel Corp. Builder states that machine is largest ever built.

Mexico Refractories Co. . . Mexico, Mo., firm has started construction of its fifth tunnel kiln for production of fire brick. Company has also announced merger of three other fire brick firms into Mex-R-Co. Merger of Niles Fire Brick Co., Niles, O.; National Refractories Co. Inc, Van Dyke, Pa.; and Big Savage Refractories Corp., Frostburg, Md.; makes Mexico firm the nation's third largest producer.

Ohio Ferro-Alloys Corp. . . has announced installation of a new 15,000 KVA electric furnace at its Brilliant, O., plant. Earlier this year, the firm installed a similar furnace at its Philo, O., plant.

Harvill Corp. . . Los Angeles die casting plant has received a contract to produce magnesium and aluminum die castings for the Navy's Terrier guided missile.

Heights Brass & Aluminum Foundry . . Minneapolis firm has joined Non-Ferrous Founders' Society.

Allis-Chalmers Mfg. Co. . . company's West Allis, Wis., works announced a new safety record for 1955. Total time loss for year was about 9,000 days compared to 49,400 in 1942.

International Nickel Co., Inc. . . has published a booklet titled "Heat Treating Ductile Iron." Publication outlines commercial processes.

Denver Fire Clay Co. . . has been appointed as a distributor for Antara Chemicals, a sales division of General Aniline & Film Corp.

National Supply Co. . . has expanded its research facility at Torrance, Calif., by installing a vacuum melting furnace for experimental quantities up to 50 lb. Furnace will be used to study super quality steels.

Archer-Daniels-Midland Co. . . has opened a new sales office at 2525 Cline St., Houston, Texas. The office will be managed by Jack Calkins and John Florence will be technical sales rep.

National Supply: for study

Pennsylvania Glass Sand Corp. . . has opened new sales offices in New York City and Tulsa, Okla. Producer of silica products has moved New York office to the

Chrysler Building and the new Tulsa office is located in the Enterprise Building.

Hyster Co. . . industrial lift truck and tractor builder has announced two new plant additions. About 25,000 sq ft will be added to the Peoria, Ill., plant and a new plant will be erected on a 42 acre site in Danville, Ill.

Stanford Research Institute . . applied research center at Menlo Park, Calif., has published a report of its operations during 1955.

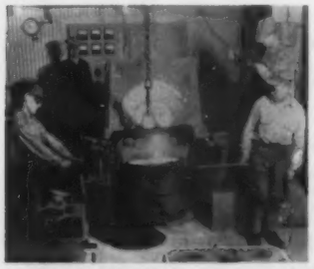
Ensign Carburetor Co. . . . Huntington Park, Calif., plant has joined Non-Ferrous Founders' Society.

Brumley-Donaldson Co. . . . has opened a new sand testing laboratory in Huntington Park which will operate under the supervision of Frank Brewster.

Lone Star Steel Co. . . . Dallas company reports $37 million in sales revenue during 1955. Announcement was made at stockholder's meeting which featured election of W. H. Johnson to board of directors.

Arwood Precision Casting Corp. . . . Brooklyn firm has announced increase in 1955 to slightly less than $5 million.

Empire Steel Castings, Inc. . . . has installed a new induction melting furnace at its Reading, Pa., plant. New equipment permits increase in production of corrosion resistant steel castings.



Empire Steel: for production

Baker-Raulang Co. . . . has two new outlets for customer service. A new branch office has been established for Milwaukee, and Mechanical Handling Co. has been named a distributor in the Seattle area.

Texas Electric Steel Casting Co. . . . Houston firm observed its 30th anniversary during April. Plant began production in 1926 with 20 employees, now has 280. Production of plant is consumed by petroleum industry, ship builders and machinery firms.

Texas Electric Steel: Wilson Dedmon, early employee, talks of old times with company head T. H. Shartle and A. B. Keckley.

Industrial Equipment Co. . . . Minster, Ohio, producer of pouring equipment has joined Foundy Equipment Manufacturers Association.

Metal Carbides Corp. . . . has named A. C. Wickman, Ltd., Etobicoke, Toronto, as its sales representative in the Dominion.

Samuel Greenfield Co. Inc. . . . has opened new and enlarged offices at 115 N. William St., South Bend 1, Ind.

Semet-Solvay . . Allied Chemical & Dye Corp. division has moved its offices to the plant at 16125 Cleophus Parkway, Allen Park 10, Michigan.

Atlas Mineral Products Co. . . . Mertztown, Pa., company has named Ballagh & Thrall of Philadelphia as its export manager for all countries except Mexico and the United Kingdom.

Basic, Incorporated . . is the new corporate name of Basic Refractories, Inc., Cleveland.

Walworth Co. . . . reports net income for the first three months of $1,139,-226.

Foundry Equipment Manufacturers Association . . has released the 1956 edition of the FEMA Yearbook, a guide to producers of equipment for foundries.

American Steel Foundries . . reports net income of $4,327,587 or $3.56 per share in the six months ending March 31.

Blaw-Knox Co. . . . reports earnings of $1,420,000 for the first three months of 1956.

Thor Power Tool Co. . . Aurora, Ill., firm has announced that the production of its SpeedWay Mfg. Co. division will triple when new plant is completed at LaGrange Park, Ill.

Caterpillar Tractor Co. . . . will build a new plant at Aurora, Ill., as part of company-wide four year expansion program.

International Nickel Co. of Canada, Ltd. . . . announced that 1955 was its most successful year.

Shieldalloy Corp. . . . producer of pure chromium metal and master alloys has transferred sales organization to its plant in Newfield, N. J.

Announce Program for International Castings Congress

■ The 23rd International Foundry Congress will be held in Dusseldorf, Germany, September 1-9, in conjunction with GIFA the first foundry trade fair ever held at an international level. The congress is an activity of the International Committee of Foundry Technical Associations, a committee of representatives from the technical organizations of the metal castings industries of 15 nations.

About 30 technical addresses will be presented during the congress, including an official exchange paper from the American Foundrymen's Society to be presented by AFS Vice-President H. W. Dietert.

The preliminary program follows:

Saturday, September 1

9:00 am . . 47th meeting of the Verein Deutscher Giessereifachleute.
11:00 am . . Opening of the Congress and of the GIFA.
6:00 pm . . Reception by the Lord Mayor of Dusseldorf at Benrath-Castle.

continued on facing page

Sunday, Septmeber 2

9:00 am . . Rhine tour to Rudesheim.

Monday, September 3

9:00 am . . VDI/VDG Lectures: "Design and casting."
1:30 pm . . Visits to industrial plants.
2:00 pm . . Meeting of the International Committee on Foundry Defects.
4:00 pm . . Meeting of the International Committee for the Technical Dictionary of Foundry.
7:00 pm . . Reception of the delegations of the individual countries by the chairmen of the VDG and WGI.
8:00 pm . . Dinner of the International Committee.

Tuesday, September 4

7:00 am . . Trip to the Volkswagenwerk.
9:00 am . . Visits to industrial plants.
2:30 pm . . Meeting of the International Committee on Testing Cast Iron.
8:00 pm . . Variete evening.

Wednesday, September 5

9:30 am . . Technical lectures (8 papers)
3:00 pm . . Technical lectures (6 papers)
6:00 pm . . Reception by the Chairman of the Dusseldorf Chamber of Commerce and Industry.
7:00 pm . . Beer evening in the 100 year old Brewery Cellar of the Dieterich Brewery.

Thursday, September 6

9:30 am . . Technical lectures (8 papers)
3:00 pm . . Technical lectures (6 papers)
8:00 pm . . Symphony concert.

Friday, September 7

9:00 am . . Visits to industrial plants.
3:00 pm . . Meeting of the International Committee.
7:00 pm . . Reception by the Chairman of the International Committee.
8:00 pm . . Congress Banquet.

Saturday, September 8

10:30 am . . Official closing ceremony.

Sunday, September 9

9:00 am . . Post Congress tours start.

Hand me a slick willya?

for the asking

Super-clean air and how to get it is all told in 4-page, 2-color Bulletin 557-D. It describes the use of a filter coating that converts cloth-type dust collectors to high efficiency models that outperform disposable or viscous filters and low-voltage electrostatic precipitators. Specs and data are included. *Wheelabrator Corp.*

CIRCLE NO. 61, PAGE 21-22

Shell-mull unit will turn out 800 to 1200 pounds of coated sand each hour when hooked to a Simpson Porto-Muller. Four-page "New Dimension" booklet introduces the components, tells a little about how it works. *National Engineering Co.*

CIRCLE NO. 62, PAGE 21-22

Electrical distribution systems for industrial power operations is the topic of 48-page Bulletin GED-3039. Planning, features, advantages, applications, operation and other data are included along with plenty of pictures of system components. *General Electric Co.*

CIRCLE NO. 63, PAGE 21-22

Rubber products for industry are pictured and described in 22-page Condensed Catalog, 25C. These include a new kind of belt drive, V-belts, conveyor belts, air hose, water and steam hose, and many specialized hoses. *Manhattan Rubber Div., Raybestos-Manhattan, Inc.*

CIRCLE NO. 64, PAGE 21-22

Clamshell buckets with significant names are specified in new price list. Letters preceding the bucket number specify use, numbers indicate capacity. SR2, for example, means a standard rehandler of 2 cu yd; GP114 is general purpose, 1¼ cu yd. *Erie Strayer Co.*

CIRCLE NO. 65, PAGE 21-22

Dielectric core ovens described in 4-page Bulletin 654 give fast and uniform baking. Cores are baked as they pass between electrodes charged with high potential which reverses polarity several million times per second. Small cores take 2 or 3 minutes to dry; they can't be overlooked because their internal water is needed for the process. Once dry, that's it. *Foundry Equipment Co.*

CIRCLE NO. 66, PAGE 21-22

Four investigations into foundry practices are contained in "Foundry Practice" No. 4. These are, by title: Brass plumbing fitting shows defect on plating; How design is affected by foundry practice; Aluminum sand casting; and Pyrometry in the foundry. Sound technical data without too much pure theory. *Foundry Services, Inc.*

CIRCLE NO. 67, PAGE 21-22

Spider chills with more surface and volume are shown in "Heavyweight" brochure. Clean bright or coppered finishes are available in wide range of sizes. *Standard Horse Nail Corp.*

CIRCLE NO. 68, PAGE 21-22

Electric tool catalog contains a full line of universal electric models for both light and heavy duty. Power

wrenches, sanders, saws—they're all fully specified, along with their attachments and accessories. *Thor Power Tool Co.*

CIRCLE NO. 69, PAGE 21-22

Plastic firebrick for ladle lining withstands high temperature shock, reports "Helspot" bulletin. It's not af-

fected by either basic or acid metals, has a lubricated surface, makes slag removal a snap. It's also useful in lining spouts and runners. Six big pictures show just how to do it. *Mexico Refractories Co.*

CIRCLE NO. 70, PAGE 21-22

Planetary gear transmissions are presented in 8-page booklet showing 7 new transmissions. These are of the planetary type. They come with one

or two forward speeds, a choice of reverse ratios, and 85 or 150 to 200 ft-lb torque. They offer a simple, versatile, and extremely flexible means of power transmission, with good efficiency. Booklet "Plan-Gear Transmission" covers operation, advantages, uses, and complete design data including dimension drawings. *American Gear & Mfg. Co.*

CIRCLE NO. 71, PAGE 21-22

Core and mold blower is thoroughly discussed in 38-page "Facts About San-Blo". Lots of case histories, many pictures, much technical information; in all, a fine and complete job. *Federal Foundry Supply Co.*

CIRCLE NO. 72, PAGE 21-22

Belt drive described in Catalog 66-38B is described as "revolutionary". It eliminates matching problems, gives greater interchangeability of belts and sheaves, offers more speed ratios with stock sheaves, cuts belt and sheave inventories, is narrower for given power transmission, and wears less. Furthermore, it's non-sparking, oil proof, and heat resistant. *Raybestos-Manhattan, Inc.*

CIRCLE NO. 73, PAGE 21-22

Universal blowplate allegedly combines some standard core room practices with new features in core blowing. The unit consists of three plates with blowholes through each. Top-plate fastens to core blower magazine. Bottom two, bolted in one unit, lets blowtubes act as spacers. Special gasket slips between upper and lower plates. Jobs can be changed in 15 seconds this way! Bulletin FP-855 tells the rest and shows pictures. *Dodge Steel Co.*

CIRCLE NO. 74, PAGE 21-22

Vibrating conveyors for solid materials from ashes through clay and iron borings to wood flour are thoroughly presented in a big 36-page catalog, No. 890. These units are simple, dependable, and rugged, with a wide choice of drives, sizes, motors, decks, and accessories. Graphs show which will move how much of what how long. Specifications are unusually complete. *Jeffrey Mfg Co.*

CIRCLE NO. 75, PAGE 21-22

Goosenecks for die casting machines are presented in Bulletin 356. Each is custom-made to specifications from a special alloy which will outlast iron goosenecks by as much as 5 years. Special design resists cracking, bottom breakout, spout erosion. *Dodge Steel Co.*

CIRCLE NO. 76, PAGE 21-22

Shell molding unit gives a fast cycle without much maintenance. Two machines and one man, says Catalog 2, is the most profitable shell molding setup devised so far—one molding machine, one shell bonder, one un-skilled worker is all it takes. Full specifications are included in the 4-page, 2-color catalog. *Shell Process, Inc.*

CIRCLE NO. 77, PAGE 21-22

Technical books are described in two pamphlets. One pamphlet covers books in the metalworking field; the other covers heating, ventilating, air conditioning, piping and plumbing, and related topics. *Industrial Press.*

CIRCLE NO. 78, PAGE 21-22

Air devices of various kinds are detailed in 4-page Circular 587. The units eliminate air leaks, meet all requirements for lasting, low-cost service. Dimensions, pressure requirements, and complete descriptions are given. *Lunkenheimer Co.*

CIRCLE NO. 79, PAGE 21-22

Reciprocating compressor is available with either single or multi-stage compressor cylinders, with rates to 600 hp as belt-driven or packaged units. Bulletin F-80. *Cooper-Bessemer Corp.*

CIRCLE NO. 80, PAGE 21-22

Dispersions for industry are given in 4-page bulletin listing 41 colloidal and semi-colloidal dispersions for the metalworking and foundry industries. These include dispersions of graphite, molybdenum disulfide, mica, vermi-

CIRCLE NO. 219, PAGE 21-22

culite, zinc oxide, and acetylene black. Carriers, diluents, applications and physical data are all there. "Dag Dispersions List." *Acheson Colloids Co.*

CIRCLE NO. 81, PAGE 21-22

Metal melting furnaces shown in Bulletin 102 are of the single burner, stationary crucible type. They melt brass, bronze, or aluminum, and may be gas or oil fired. Cutaway drawings and specification table are included. *Campbell-Hausfeld Co.*

CIRCLE NO. 82, PAGE 21-22

Shell mold adhesives give rapid and effective fusing of shells, eliminate finning, maintain accurate dimensions across the parting line, and make it possible to pour all but the largest molds without backup. One is for hot molds only, the other for both hot or cold. They both grip strong enough for horizontal pouring without support on most molds. "Shallway Shell Mold Adhesives." *Shallway Corp.*

CIRCLE NO. 83, PAGE 21-22

Dust collector Bulletin 291 gives salient facts on a dry centrifugal collector that is alleged to work on a revolutionary principle. Air swirls in, dust is thrown to the outside, clean air zips out the end without changing direction. Full dimensions given for all models. *American Air Filter Co.*

CIRCLE NO. 84, PAGE 21-22

Historical brochure tells about the first iron works restoration at Saugus, Mass. The remarkable and lasting precedents established there 311 years ago bear careful thought and study. Easy and interesting reading which will make anyone proud of the foundry industry. "The Hammersmith Legacy." *United Oil Mfg. Co.*

CIRCLE NO. 85, PAGE 21-22

Bulk weighing scale for process weighing accurately handles one or more ingredients, consecutively or cumulatively, in a batch or continuous operation. Bulletin 3649A, 6 pages, tells all about applications, controls, capacity, construction, and accuracy. Cutaway drawings, dimensions, and specs are included. *Richardson Scale Co.*

CIRCLE NO. 86, PAGE 21-22

Special alloys described in Vol. XXVI, No. 4 of "Better Castings" include one for bronze castings, a galvanized brightener, an aluminum bronze degasifier, aluminum solder, and a boron copper alloy. *Niagara Falls Smelting & Refining Div., Continental Copper & Steel Industries, Inc.*

CIRCLE NO. 87, PAGE 21-22

Noise control in factories has led to a doorless telephone booth which excludes outside noise interfering with conversations. It can be used in extremely noisy locations where errors in receiving phone calls can be serious and costly. Bulletin A-140 gives all the facts. *Burgess-Manning Co., Architectural Products Div.*

CIRCLE NO. 88, PAGE 21-22

Molybdenum carbides and nitrides are detailed in 6-page Bulletin Cdb-7, which summarizes applications; physical, chemical and mechanical properties; and preparation. Added section on multicarbide systems is included. *Climax Molybdenum Co.*

CIRCLE NO. 89, PAGE 21-22

Roller bearing catalog has 72 pages crammed with specifications and data on self-aligning units. The principle is concave rollers running between convex raceways. Engineering data, load rating tables, exploded views. Catalog 55. *Chain Belt Co.*

CIRCLE NO. 90, PAGE 21-22

Wire rope for industrial services is shown in 24-page Bulletin DH-128D. Contents cover more than 120 different types of wire ropes, telling just where each should be used. Each recommendation tells rope diameters, construction, preforming, lay, grade and core. Charts cover weights and breaking strengths. *American Cable Div., American Chain & Cable Co.*

CIRCLE NO. 91, PAGE 21-22

Pearlitic malleable is growing for crankshaft production uses, reports Malleable Iron Facts No. 53. Multiple assemblies and welded assemblies are also going to malleable iron, the 4-page brochure says. *Malleable Founders' Society.*

CIRCLE NO. 92, PAGE 21-22

Anti-rust paints are detailed in 2-color brochure which gives full data on Rustrem applications, prices, and shipping. Application photos show how and where it can be used. *Speco, Inc.*

CIRCLE NO. 93, PAGE 21-22

DC motors built to the new NEMA specs are described in Bulletin GEA-6355. Data is given on electrical and mechanical features, versatility of the standard line, features for easier maintenance, plus dimensions and ratings. *General Electric Co.*

CIRCLE NO. 94, PAGE 21-22

Excitation unit for spectrochemical analysis has been completely redesigned from an early model. It comes in three standard models with up to

foundry facts

Exhaust Hood Data for Wood Working Machinery

Information has been excerpted from the new publication ENGINEERING MANUAL FOR CONTROL OF IN-PLANT ENVIRONMENT IN FOUNDRIES *prepared by the Dust Control and Ventilation Committee under the Safety, Hygiene and Air Pollution Control Program of the American Foundrymen's Society.*

■ Wood working machines are often the source of fires; thus local exhaust ventilation is sometimes necessary in order to remove sawdust and wood shavings from floors and machinery in pattern shops.

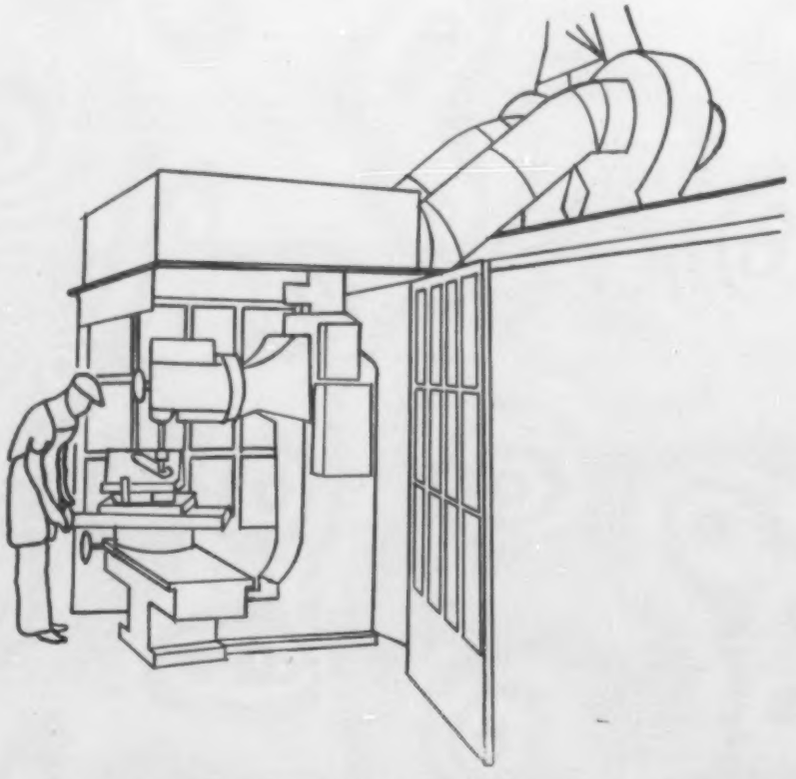
Exhaust hoods should be adapted to the type of machine they ventilate, and should be installed at the point of operation. A hood should never interfere with reasonable movement of the machine operator nor obstruct his vision of the cutting tool or of the tool guard.

The principle that hoods should be designed for easy access to belts, motors, cutting tools, etc., is patently obvious; yet this basic need is often ignored. Provision for convenient maintenance should begin right on the drawing board.

The trend of equipment manufacturers to build hoods right into the machinery as an integral part is encouraging. Such hoods, since they are a part of the machine, are usually less cumbersome and quite often more efficient than those makeshift hoods installed purely as an afterthought.

Of course, hoods for any kind of wood working machine can be and often are quite well designed in the shop by the use of the sound engineering principles explained in ENGINEERING MANUAL FOR CONTROL OF IN-PLANT ENVIRONMENT IN FOUNDRIES. Illustrations of typical hoods shown in the manual eliminate the need for calculating hood design in most cases. The designer must keep in mind, however, that dust velocities of approximately 4000 fpm are recommended in order to insure satisfactory convection of sawdust, shavings and chips as well as to meet the requirements of most state laws. Some authorities suggest transport velocities of 1200 fpm for sawdust and 3000 fpm for wood chips. These values are probably on the conservative side.

The table on the next page gives suggested exhaust volumes and branch duct sizes for wood working machines commonly found in the pattern shop. Duct sizes are based on a velocity of 4000 fpm, and are adjusted to the nearest standard pipe dimension. Obviously, some modern high speed or extra large machines will need more exhaust air, while small units of the home workshop or bench type can get along with less.



Hood for boring mill is typical of the sound type of home-made unit that can be built by the application of engineering principles. In this shot, the near side door has been left open; in use, this door would be kept tightly shut. Side doors contain translucent glass to let in an even, diffused light. Two six-inch pipes lead to two ducts, one on each side. The pipes are connected to 12 by three-inch floor sweeps. Grilles are properly sized to exhaust enough volume of air to result in a face velocity of 200 fpm across the booth face. This allows for 650 cfm through each floor sweep.

foundry facts

Exhaust Hoods / Pattern Shop

Type of unit	Exhaust volume, cfm			Duct size, inches	
Self-feed table rip saw	Bottom	Top	Total	Bottom	Top
Up to 16" saw diameter	440	350	790	4.5	4
Over 16" saw diameter	550	350	900	5	4
Self-feed not on table	800	550	1350	6	5
Gang rip saws	Bottom	Top	Total	Bottom	Top
Up to 24" saw diameter	550	350	900	5	4
24 to 36" saw diameter	800	440	1240	6	4.5
36 to 48" saw diameter	1100	550	1650	7	5
Over 48" saw diameter	1400	550	2060	8	5
All other types of saws					
Up to 16" saw diameter		350			4
16 to 24" saw diameter		440			4.5
Over 24" saw diameter		550			5
Variety with dado head		550			5
Band saws, band resaws	Down run	Up run		Down run	Up run
Up to 2" blade width	350	350		4	4
2 to 3" blade width	550	350		5	4
3 to 4" blade width	800	550		6	5
4 to 6" blade width	1100	550		7	5
6 to 8" blade width	1400	550		8	5
Jointers					
Up to 6" knives		350			4
6 to 12" knives		440			4.5
12 to 20" knives		550			5
Over 20" knives		800			6
Single planers					
Up to 20" knives		500			5
20 to 26" knives		800			6
26 to 36" knives		1100			7
Over 36" knives		1400			8
Double planers	Bottom	Top	Total	Bottom	Top
Up to 20" knives	550	550	1100	4.5	4.5
20 to 26" knives	550	800	1350	4.5	6
26 to 36" knives	800	1100	1900	6	7
Over 36" knives	1100	1100	2500	7	7

Molders, matchers, sizers	Bottom	Top	Right	Left	B	T	R	L
Up to 7"	440	550	350	350	4.5	5	4	4
7 to 12"	550	800	440	440	5	6	4.5	4.5
12 to 18"	800	1100	550	550	6	7	5	5
18 to 24"	1100	1400	800	800	7	8	6	6
Over 24"	1400	1770	1100	1100	8	9	7	7

Type of unit	Exhaust volume, cfm	Duct size, inches
Swing Arm Sanders		
All sizes	440	4.5
Vertical belt sanders (rear belt and pulleys enclosed) and **Top run horizontal belt sanders**		
Up to 6" belt width	440	4.5
6 to 9" belt width	550	5
9 to 14" belt width	800	6
Over 14" belt width	1100	7
Disc sanders		
Up to 12" disc diameter	350	4
12 to 18" disc diameter	440	4.5
18 to 26" disc diameter	550	5
26 to 32" disc diameter	Two pipes, 350 each	4
32 to 38" disc diameter	Two pipes, 350 and 550	4 and 5
38 to 48" disc diameter	Three pipes, 550, 350, 350	5, 4, 4
Tripple drum sanders		
Up to 30" long	1100	7
30 to 36" long	1400	8
36 to 42" long	1800	9
42 to 48" long	2200	10
Over 48" long	3100	12

Horizontal belt sanders (bottom run is used)	Bottom	Top	Total	Bottom	Top
Up to 6" belt width	440	350	790	4.5	4
6 to 9" belt width	550	350	900	5	4
9 to 14" belt width	800	440	1240	6	4.5
Over 14" belt width	1100	550	1650	7	5

Type of unit	Exhaust volume, cfm	Duct size, inches
Woodshapers		
Depending on size	440 to 1400	4.5 to 8
Automatic lathe		
Depending on size	800 to 5000	6 to 15
Forming lathe		
Depending on size	350 to 1400	4 to 8
Dowel machine		
Depending on size	350 to 800	4 to 6
Glue jointer		
Any size	800	6
Gainer		
Depending on size	350 to 1400	4 to 8
Router		
Depending on size	350 to 800	4 to 5
Floorsweep		
6 to 8" diameter	800 to 1400	5 to 8

5 different excitation circuits. Catalog V2-56 gives a complete description of the units, including detailed data on circuit parameters. *Jarrell-Ash Co.*

CIRCLE NO. 95, PAGE 21-22

Analyzer for determining hydrogen and carbon content in titanium, zirconium, iron and steel, and the heat-resisting alloys of iron, cobalt, and nickel is presented in "Hydrogen and Carbon Analyzer." It uses a high-frequency combustion furnace to release the elements as gasses; they are then oxidized to water and CO_2, collected in absorption bulbs, and weighed. *National Spectrographic Labs, Inc.*

CIRCLE NO. 96, PAGE 21-22

Welding procedures for every base metal are given in 140-page pocket data book TIS 2575. Information covers 120 welding rods, electrodes, and welding compounds. Full of invaluable know-how, plus plenty of data on special applications, methods, adjustments, preparation—just about everything. *Eutectic Welding Alloys Corp.*

CIRCLE NO. 97, PAGE 21-22

Ribbon burners, specially designed gas-fired heating units which produce a narrow, uniform sheet of flame, are presented in Bulletin SC-1004. Eight pages show cutaway views, specifications, and performance charts. *Selas Corp. of America.*

CIRCLE NO. 98, PAGE 21-22

Shell molding machine is reported to put precision shell molding on a production basis. Compact and rugged, Shell-O-Matic produces precision shells for ferrous and non-ferrous metals. Simple to operate, it ejects completely cured shells at a good clip. *Shell-O-Matic, Inc.*

CIRCLE NO. 99, PAGE 21-22

Sloppy methods come under fire in News Letter 45, especially slag inclusions at the in-gate area, and leaving out cores, a practice which is apparently on the increase. *American Colloid Co.*

CIRCLE NO. 100, PAGE 21-22

Bulk conveyors and how they fit into specific foundry operations are presented in Bulletin 39, a 16-page 2-color publication. *Ajax Flexible Coupling Co., Inc.*

CIRCLE NO. 101, PAGE 21-22

Die casting machine Bulletin 5400 sports a huge cutaway drawing showing just what the chief features are and where they are located on the unit. Both the cold chamber line and the gooseneck line are completely described, dimensioned, and specified. *Hydraulic Press Mfg. Co.*

CIRCLE NO. 102, PAGE 21-22

Floor surface hardener is described in Bulletin SH56 as an easily applied, long lasting compound. Included in the illustrated bulletin are recommended specs and estimating data, materials, mixing, application, and curring. *Walter Maguire Co., Inc.*

CIRCLE NO. 103, PAGE 21-22

Preheated air blast unit is described in 4-page illustrated Bulletin FY-174. Basic design, which gives operating efficiencies of over 70%, can be adapted to suit any foundry. Air bypass system lets heater continue operation and maintain air temperature even when cupola blast is shut off. *Whiting Corp.*

CIRCLE NO. 104, PAGE 21-22

Metal reclaiming mill is a complete unit for making a marketable product of low grade scrap. It acts as a mill, grinder, separator, concentrator, and washer. It recovers all metal from skimmings, cinders, slag, furnace linings, etc. Bulletin M-47. *Dreisbach Engineering Corp.*

CIRCLE NO. 105, PAGE 21-22

Carbon dioxide analyzers are described and pictured in four-page Catalog 56-553-1. These chemically operated units are covered as to application, principle, features, available models, operation, and sampling systems. *Hayes Corp.*

CIRCLE NO. 106, PAGE 21-22

Spectrochemical analysis is presented in full-color brochure that graphically illustrates the scope of this science and the steps involved from sample preparation through recording line spectra on film to interpretations. *National Spectrographic Laboratories, Inc.*

CIRCLE NO. 107, PAGE 21-22

Control valves, pilot operated, are shown in 6-page Bulletin Sk356, printed in 3 colors. It describes the operation, uses, optional features of single and double solenoid valves, and is profusely illustrated with over 24 pix. Tables cover types of service, pressure ranges, specs and sizes. *Valvair Corp.*

CIRCLE NO. 108, PAGE 21-22

Portable lifts and what to consider in their proper application are detailed in "Factors for Proper Application of Portable Lifts". The literature tells where, when and how; ten pics

show the units in use. Text tells about different types, under what general conditions to use which, and other pertinent data. *Oster Mfg. Co.*

CIRCLE NO. 110, PAGE 21-22

Refractory ramming mix is shown in two sheets, one describing the compound and the other furnishing application data. This hydraulic setting mix is for aluminum furnaces, and will not be wet by molten aluminum. Installed as a monolithic lining, no joints are present to serve as potential weak spots. Ask for "Furn-A-Ram" sheets. *Mexico Refractories Co.*

CIRCLE NO. 111, PAGE 21-22

Vinyl plastic paint for exterior surfaces comes in 8 colors, reports Bulletin LL-2421. It goes on with brush, spray, or roller, dries in 2 hours to a smooth, leathery surface. It's for coating cement and cinder blocks, brick, new or old wood, asbestos shingles, stucco, masonry, and stone. No water penetration, but the surface can still "breathe." *Wooster Sealkote Co.*

CIRCLE NO. 112, PAGE 21-22

Pyrometers good enough to be used in U.S.A.E.C. atomic installations are featured in automatic control bulletin. Its 40 pages contain many other meters and relays, including an automatic temperature control with cold junction compensation. Much do-it-yourself circuitry data, plus ordering specifications—these units are sold direct to customer. *Assembly Products, Inc.*

CIRCLE NO. 113, PAGE 21-22

Pneumatic core breaker is specified and pictured in 2-page sheet, "CB27 Core Breaker". Especially suited to foundry work, the unit is detailed as to piston bore, length, weight, air hose, air connection, chunk size, and air pressure. Other features are listed. *LeRoi Division of Westinghouse Air Brake Co.*

CIRCLE NO. 114, PAGE 21-22

Silicones proven particularly effective as release agents in shell-mold manufacture are described in 8-page "Silicones for the Shell Molding Process." *Silicones Div., Union Carbide & Chemical Corp.*

CIRCLE NO. 115, PAGE 21-22

Molybdenum boride compounds are high-lighted in 6-page Cdb-8, "Refractory Molybdenum Borides". It gives applications; chemical, physical, and mechanical properties; and preparation. Complete data is included

CIRCLE NO. 209, PAGE 21-22

for four molybdenum borides and seven multi-boride systems. The latter include compositions with borides of nickel, chromium, cobalt, iron, titanium, tungsten, and zirconium. *Climax Molybdenum Co.*

CIRCLE NO. 116, PAGE 21-22

Aluminum fluxes, what they are, what they do, and how to use them is all told in two-color illustrated flux data booklet. Five types are covered: sand cast, permanent mold, heat treated, die cast, and magnesium containing. *Apex Smelting Co.*

CIRCLE NO. 117, PAGE 21-22

Dock bumpers are detailed in a new specification sheet that gives design and installation information. More than a dozen drawings show the types and how they are mounted on concrete, wood, etc. *Bumpers, Inc.*

CIRCLE NO. 118, PAGE 21-22

Platen conveyor, a heavy-duty unit, is loaded with features for precise synchronization for integrated operations. It comes in lengths to 100', and can be extended in 101 sections beyond that. Form 2356. *Visi-trol Engineering Co.*

CIRCLE NO. 119, PAGE 21-22

Cold setting binder is thoroughly gone into in 4-page technical bulletin, "Kold-Set". Raw materials, procedure, type of sand, sand temperatures, mulling procedure, set-up time, rodding, core baking, core finishing—all this and production tips and illustrations too. *G. E. Smith, Inc.*

CIRCLE NO. 120, PAGE 21-22

Non-ferrous cleaning in four foundries is detailed by case histories of each. "How to Add Profit to the Nonferrous Cleaning Room," four pages. *Wheelabrator Corp.*

CIRCLE NO. 121, PAGE 21-22

Fork trucks in the foundry is the featured article in Vol. 14, No. 1 of "Handling Materials Illustrated." This 8-page tabloid newspaper sized publication contains other case histories as well. Also included are three sections treating maintenance, special accessories, and a new 400-lb. unit. *Towmotor Corp.*

CIRCLE NO. 122, PAGE 21-22

Mobile sand conditioner is small enough to work in most foundries but has enough capacity to be practical. A device that holds sand in place by centrifugal force is the heart of the machine; it will lift three tons

CIRCLE NO. 209, PAGE 21-22

per minute, more than the rest of the unit can handle. One man operates it. "Ringlift" bulletin really tells a complete story in an intelligent, straightforward way. *States Engineering Corp.*

CIRCLE NO. 123, PAGE 21-22

Spectrographic source unit shown in 4-page Bulletin 35A is specified as to controls, AC spark, AC arc, DC arc, arc ignitor, utilities, and physical characteristics. General description of construction and uses are included. *Baird Associates, Inc.*

CIRCLE NO. 124, PAGE 21-22

Lubricating once every 12 hours with a special oil has kept the drive chain of a shell molding machine going for six years now, reports Vol. 1, No. 1 of the Dag Disperser. The chain moves a heavy carriage 16 feet every 90 seconds—and works around the clock. *Acheson Colloids Co.*

CIRCLE NO. 125, PAGE 21-22

Disc wheels for right-angle portable grinders and sanders are made from custom compounded bonds, giving fast cutting, longer life, more strength, and uniform action. It's all told in Form 6901-E. *Abrasive Wheel Dept., Manhattan Rubber Div.*

CIRCLE NO. 126, PAGE 21-22

Zinc-base alloys for die casting are described in pocket-size 24-page Zamak reference book. It outlines dimensional stability, gives charts on composition and limits, and chemical requirements. Other charts show mechanical requirements, physical and mechanical properties, corrosion resistance. *Henning Bros. & Smith.*

CIRCLE NO. 127, PAGE 21-22

Shell core blowers covered in 2-page sheet come in three models: MC-3 for small shell cores, MCM-6 for large ones, and MC-5 for medium. Each is pictured and specified as to core box dimensions, machine dimensions, and power requirements. "Shell Core Blowers." *Shallway Corporation.*

CIRCLE NO. 128, PAGE 21-22

DC generators for a dependable supply of industrial power are specified in Bulletin GEA-6461. These units provide ¾ to 100 KW. Giant cutaway drawing in color supplements the data section. *General Electric Co.*

CIRCLE NO. 129, PAGE 21-22

Cut-off wheels detailed in 4-page, 2-color Form 6649 are made for foundries. They are reinforced both radially and laterally for peak per-

formance. Bulletin gives all necessary information. *Abrasive Wheel Dept., Manhattan Rubber Div.*

CIRCLE NO. 130, PAGE 21-22

Tooling plastics are priced in 4-page "Rezolin Toolplastick" list. It includes phenolics, epoxies, and ethyl cellulose. *Rezolin, Inc.*

CIRCLE NO. 131, PAGE 21-22

Wood flour and its uses in preventing such common foundry faults as rat tail, buckle, and scab is presented in detail in form WFA. Each defect is pictured, along with causes and remedies. *American Colloid Co.*

CIRCLE NO. 132, PAGE 21-22

Bronze globe valves are detailed in 2-page, 3-color Circular 605. The LQ600-200 valve is rated at 200 lb SP and 400 lb WOG. It comes in 8 different sizes from ¼ through 2" diameters, with Brinalloy seats and discs. *Lunkenheimer Co.*

CIRCLE NO. 133, PAGE 21-22

Herb is back with a report on that test bar.

Note AFS Cooperation

A certificate of cooperation has been awarded the American Foundrymen's Association by the International Cooperation Administration for "courtesy and assistance in making the study tour of Danish foundry consultants an outstanding success."

AFS has cooperated in planning a series of tours of U. S. plants and educational facilities for foreign industrialists and educators, the so-called "productivity teams." The most recent tour was made by a group of Spanish foundrymen.

local foundry news

Working . . .

It takes a lot of work to make a casting good enough for the AFS Kennedy Apprentice Contest, as these lads well know. The young men in the center are apprentices from Atlas Foundry, Tacoma, who won prizes in the regional apprentice contest arranged by the **Washington** Chapter. Checking over a mold are, left to right, William Gibb, chief of inspection at Atlas; John Long, company secretary-treasurer; Dan Franks, 2nd place in gray iron molding; Harold Van Haitsma, 1st place in gray iron molding; Nathan Rosier, 1st place in steel molding; and Leo Long, the plant's works manager.

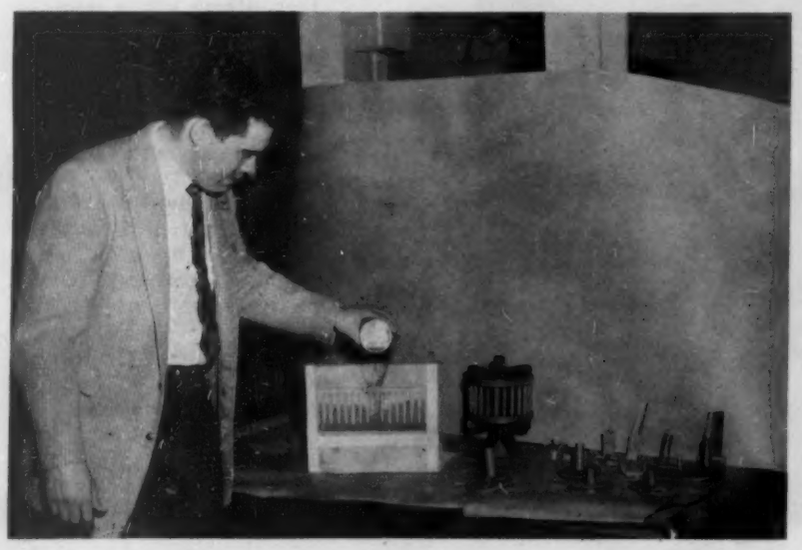
PHOTO BY FRED RIDENOUR, WHITING CORP.

Dignitaries at the **Mo-Kan** Chapter speaker's table were, left to right, E. H. Haydon; Herman L. Smith, speaker; Robert W. Trimble, a national director of AFS; and Henry Dederding, chairman of the chapter.

If it is true that still waters run deep, things may have been pretty deep around this table at a **Chicago** Chapter meeting. Thinkers are Robert P. Schauss, Robert Cech, and Clifford E. Wenninger.

Judging . . .

Your work has to be good to win in an apprentice contest. Here, Paul Copeland, Ford Motor Co., judges entries in a pattern contest held by the **Detroit** Chapter prior to the national AFS competitions.



F. D. Lordi, supervisor of the General Electric Co.'s investment foundry, used this hollow plaster gating system to demonstrate the effectiveness of various gating systems to members of the **Eastern New York** Chapter. Lordi stressed value of investment castings for very high temperature applications and stated that investment castings are useful in investigating alloys for use in these high temperature application developments.

PHOTO BY ROBERT G. KING, OBERDORFER FOUNDRIES, INC.

Leon Hall and Wm. C. Dunn presented a gift of 68 books on castings to Syracuse Univ. as a gift from **Central New York** Chapter's Past Chairmen's Club. In the picture at the right, Hall represented the club, Dunn the chapter, and Dr. H. P. Munger the school. Club members on hand for the affair were, left to right, Don Merwin, W. D. Dunn, John Livingston, Lloyd D. Wright, Munger, J. A. Feola, C. M. Fletcher, R. A. Minnear, E. G. White, and Hall.

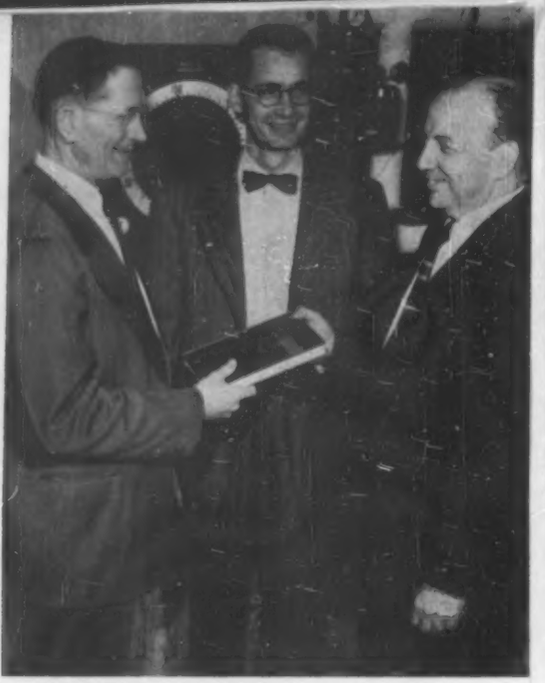


PHOTO BY ROBERT G. KING, OBERDORFER FOUNDRIES, INC.

Members of this animiable group represent both the **Metropolitan** Chapter of AFS and the local section of the Society for Non-Destructive Testing. Guest speaker was Solomon Goldspiel, metallurgy supervisor at the New York Naval Shipyard.

Winning . . .

Hard work may be its own reward, but there are sometimes other returns too. In this case, the winners of the **Detroit** Chapter's apprentice pattern contest have been rewarded with handsome trophies. The winners, pictured with R. H. Spengler, Annex Pattern Co., are Roy Burmeister, Jason Cameron, William Kuschell, James Smith, Thomas Laundra and Jim Uhley. Uhley is employed by Ford Motor Co., but all other winners were from Annex.

Central Michigan provides a lot of equipment for its guest speaker, Dr. Robert Thompson, chief of metallurgical engineering for General Motors Corp.

At the March meeting of the **Tennessee** Chapter were these Vols: Lou Durdin, Ralph Merriman, Dr. Gene Stansbury, Jack Lucas, and William B. Greiser.

Save your Confederate dollars, boys and bring the real, honest-to-goodness long green when you come out to the **Texas** Chapter. Here E. F. Laminack of Texas Steel pays off for 12 of his boys who attended a Fort Worth meeting.

Catherine Flynn Retires After 43 years at NFA

■ Miss Catherine Flynn, assistant secretary of the National Foundry Association, will put her pen aside and retire on July 1 after 43 years of service with the association. However, this bright-eyed, nationally known figure in the metal cast-

Catherine Flynn: 43 volumes

ings industry won't close the covers of her personal history with NFA without speculating on the contents of future volumes of the group's history.

Miss Flynn joined the staff at NFA in 1913 while she was actually on sick leave from her job at General Electric Co.'s Chicago offices. She took a temporary four-day assignment to help out with some rush work, but found the post so interesting she never left.

The pages of Miss Flynn's personal history span a period of vital developments in which she played an intimate part.

When she joined the association, it had just finished a battle over the right to work issue and the introduction of mechanized molding equipment. As she came on the scene, NFA was just launching its safety programs.

During Miss Flynn's first years at NFA the association was actively engaged in the shoe business. Workmen were hostile to the idea of personal safety as opposed to personal comfort and would not buy safety shoes. Because of the uncertain market, shoe manufacturers were reluctant to produce safety shoes until NFA underwrote the project by purchasing and carrying the stock at its headquarters. These shoes were sold to employers at cost and they in turn sold them to their men.

By the 1930's the shoe business was no longer reflected in Miss Flynn's letters, reports and ledgers, but the silicosis problem had replaced the footwear problem.

Miss Flynn was a part of the association as it worked through the 30's for engineering studies of dust control and for reasonable occupational disease laws.

Miss Flynn served through the war years of the 1940's as she and her associates helped the organization's membership tool up for wartime production and prepare training programs for new and unskilled employees brought into the labor market for the first time. During this period, over 7,000 copies of an NFA-prepared training course were distributed to foundries, technical schools and colleges, U. S. Navy yards and to all the free nations of the world.

After the war Miss Flynn lent a hand as the association began its efforts to improve management's relations with its foreman.

In all of these vigorous chapters of her life with NFA, Miss Flynn records only one misprint. That was in 1916 when she indirectly selected the association's vice-president by not editing-out an erroneous statement in one of her boss's letters. As a result, the incumbent v-p remained in office for an additional year, leaving the man actually selected out in the cold.

In commenting on present conditions in the industry Miss Flynn remarks that, "No longer are questions of wages, hours and working conditions a matter of negotiation between the individual worker and his supervisor but rather are subject of negotiations between top management and union agents representing not only employees of a single shop but often workers in an entire industry."

Because of this, Miss Flynn states that the new NFA labor-management relations program cannot be over-emphasized. It is her feeling that the next volume of NFA history will contain many chapters on its new contract analysis program, even though these chapters will be written without her aid.

products and processes

continued from page 12

Wheel span fits 5 to 12" American Standard tapered flange I-beams for relocation without reworking. Models meet all standard voltages, and the controls are interlocked to prevent damage. *Shaw-Box Crane & Hoist Div. of Manning, Maxwell & Moore.*

CIRCLE NO. 33, PAGE 21-22

Fractional hp induction motor, Model 9200, gives extremely precise results with outstanding characteristics at moderate cost. A sleeve bearing motor, Model 9200 features an open, self-ventilating frame. It's available for pad mounting, resilient ring mounting, or end mounting. Rating range for different models is from 1/250 to 1/50 hp. *Howard Industries, Inc.*

CIRCLE NO. 34, PAGE 21-22

Shakeout grids give powerful vibrations that provide fast, easy separation of hot sand from castings. Grids are built of rigid steel frame mounted on vibration dampers. Electric vibrator mounted under the grid does the work. Available in 36 x 36" standard size, Shake-Out Grids can be custom-built to specifications up to 10' square. *Syntron Co.*

CIRCLE NO. 35, PAGE 21-22

Bounceless hammers come in a line of many sizes and uses. The big feature is a hollow head loaded with steel grit, which causes the hammer to follow through instead of bouncing. Tests show it gives 30% more work, other things being equal. Hard or soft head types available. *Tahlen Hammer Co.*

CIRCLE NO. 36, PAGE 21-22

Gas sampling system for measuring O_2 in open-hearth flue gasses gives reliable results as an index of furnace performance. Sampling tubes in each down-take lead to the analyzer, which may be 200' away. Lag at this distance is only 5 sec. In one system, a recorder-controller adjusts the fuel-air ratio automatically for optimum combustion efficiency. *Leeds & Northrup Co.*

CIRCLE NO. 37, PAGE 21-22

Dry fluid drive called Flexidyne is protected by a thermal cutout. Instantaneous mechanical overload protection is inherent in Flexidyne; but if an overload causes prolonged slipping and heating, the cutout trips a

switch which cuts off the power and, if desired, sounds an alarm. Dodge thermal cutout is recommended for all unattended installations. It's easy to mount on the side of Flexidyne. It contains a trigger spring held down by an alloy thermal pin. Heat melts the pin and lets the trigger push the switch to "off" position. *Dodge Mfg. Corp.*

CIRCLE NO. 38, PAGE 21-22

Flow alarm that combines low cost with vibration-proof performance is known as the F&P Ratolarm. It uses two snap-action electrical contacts hermetically sealed in a glass tube. These are drawn together to set off the alarm by passage of a magnetic float extension rod. Positioning the switch lets it act as high or low-limit control; or two switches can be used for both limits. *Fischer & Porter Co.*

CIRCLE NO. 39, PAGE 21-22

Sand binder for molds and cores is a marked departure in chemical formulation from conventional silicate-based binders. Moroc provides a number of advantages as a bond, the manufacturer reports. These include no separation in storage, low viscosity for easy mixing, good bench life, superior gas reaction, good storage life for cores, and good collapsibility. *Delhi Foundry Sand Co.*

CIRCLE NO. 40, PAGE 21-22

Diecasting method offers multiple-part units with movable elements produced in one automatic operation—with no assembly work at all, manual or otherwise. The Intercast technique is being used on drawer pulls, swivel rings, sister hooks, miniature scissors and pliers, and lengths of chain in its one primary diecasting operation. Minimum size is unlimited; maximum length is around 1¼". *Gries Reproducer Corp.*

CIRCLE NO. 41, PAGE 21-22

Master gage set of a unique pyramid design tests the accuracy of shop micrometers. Called "Mikemaster", it consists of six lapped, hardened, and normalized steel cylinders graduated from 1 to 6" in diameter. To check his micrometer, the operator slips it over one of the cylinders to see if the mike reading checks with cylinder size. Cylinders are calibrated to 4 decimals and attached to a wood base to reduce handling. *Size Control Co.*

CIRCLE NO. 42, PAGE 21-22

Electric induction generators are reported to offer features and efficiencies never before achieved in this field. New Ther-Monic "C" series units are available in 7 sizes from 10 KW to 50 KW outputs. Tank circuit puts maximum power into the work

with almost any work coil. Control works well under any work load conditions. These generators are in totally enclosed cabinets with gasketed fittings. Enclosed water-to-water heat exchanger provides complete cooling; many other advanced features. *Induction Heating Corp.*

CIRCLE NO. 43, PAGE 21-22

Hold-down clamps called "Insta Clamps" are made of forged steel to take heavy duty. Fast and simple to operate, they eliminate the need for vises on many jobs. Narrow ledges or corners give them enough purchase; even one prong in position is strong enough. Two or more Insta Clamps quickly lock any shape work piece in position. Bulletin 56 tells all. *Bausch Products.*

CIRCLE NO. 44, PAGE 21-22

Valves for oil-hydraulic systems are improved models of the familiar Vickers DG series. They're solenoid operated and solenoid controlled directional valves with ample room in the body for electrical connections. Available for gasket or sub-plate mounting, they are compact and take a minimum of piping. Other new features include an override plunger and solenoid cover chain. All sorts of combinations and modifications are available *Vickers Inc.*

CIRCLE NO. 45, PAGE 21-22

Two-ton fork truck has lifting height of 51½ through 70½," down height of 6½ or 10½," and quick accessibility for maintenance. Named Hi-Lift Platform, it travels at 3 mph empty and 2.2 mph fully loaded, in both forward and reverse. Full-load lifting speed is 9 fpm, with lowering speed of 20 fpm. Hydraulic system has pressure relief valve for protection. *Industrial Truck Div., Clark Equipment Co.*

CIRCLE NO. 46, PAGE 21-22

Tractor-shovel has a load capacity of 2¼ cu yd or 7500 lbs. Payloader Model HO sports 4-wheel drive, complete power-shift transmission, torque converter drive, planetary final drives, 40-degree bucket break-out at ground level, powerful pry-out action, power steering, and a pressure-controlled, double-acting hydraulic system. Top speed is 4 mph. Form 302. *Frank G. Hough Co.*

CIRCLE NO. 47, PAGE 21-22

Protective skin cream contains silicone (dimenthylpolysiloxane) as the guard agent. When applied, Solucone maintains a silicone barrier that prevents skin contact with external irritants that cause dermatitis, skin

CIRCLE NO. 215, PAGE 21-22

rash, skin drying and cracking. It won't smear and washes off easily; even dye and lacquers come right off with it. *Soluol Labs, Inc.*

CIRCLE NO. 48, PAGE 21-22

Air gun which provides a protective umbrella of high pressure air is called Guardair. Part of the air stream is diverted through fluted passages to set up a conical shield of air which helps prevent chip flyback. Screen operates simultaneously with the air jet so that the gun can't be used without the safety feature. It fits standard air lines, is light and comfortable to use. *Union Engineering Corp.*

CIRCLE NO. 49, PAGE 21-22

Bench oven with large working space has temperature range of 100 to 350 F. Fan-driven forced air circulation keeps uniform temperatures throughout, with adjustable damper to give wide range of constant temperatures. Model 333 has work space of 36 by 36 by 36". Shelves are moveable and removeable, if whole oven is needed. Works off industrial current. *Grieve-Hendry Co., Inc.*

CIRCLE NO. 50, PAGE 21-22

Mechanical seal for boiler feed pumps reportedly needs no attention once installed. Long seal life is obtained through a special closed circulating system, providing cool water in the sealing chamber. It comes fully engineered for the particular jobs, including adaption to pump design and piping. Everything is specified. *Crane Packing Co.*

CIRCLE NO. 51, PAGE 21-22

Bench arbor press, Model 137-BH, has a 10-ton capacity. This compact unit will blend, straighten, mark, punch, remove and replace gears, bearings and bushings. It features finger-tip ram control and a self-contained hydraulic cylinder. Specs include 6¾" stroke and 12" max daylight opening. Bulletin 104. *K. R. Wilson Inc.*

CIRCLE NO. 52, PAGE 21-22

Air grinder designed especially for use in foundries develops half again more power than similar tools in its 7-lb weight class. It is available in speeds of 4500, 6000, and 8000 rpm, and features an adjustable, positive-speed governor which increases air economy. Built-in muffler cuts noise level. Model 5V has automatic mist oiling. *Thor Power Tool Co.*

CIRCLE NO. 53, PAGE 21-22

Cabinet ovens with temperatures to 850 F have aluminized steel interiors, and are fully insulated with 1" mono-

block, 3" mineral rock wool. Exhaust is by recirculating fan, with fresh air and exhaust controlled by manual dampers. Models range from 18 to 24" wide, 18 to 24" deep, and 18 to 30" high. Many accessories extend usefulness. *Steiner-Ives Co.*

CIRCLE NO. 54, PAGE 21-22

Soft water, equivalent in ionic purity and softness to triple distilled water, is available right from the faucet with "Pup", a compact unit which attaches to any water outlet, and needs no heat or power. It comes in sizes from 300 to 3000 gallons before regeneration, and up to 12,000 gallons when used in series. You can regenerate it yourself. *Enley Products, Inc.*

CIRCLE NO. 55, PAGE 21-22

Arc welder line is reportedly one of the most complete in the industry. Ten different types and 98 models are included, covering AC welders, DC rectifier welders, AC inert arc welders, combination AC-DC units, and mobile engine-driven DC welders. There is also a complete line of automatic control and remote control devices, switches, high-frequency units, water coolant mechanisms, and other accessories to fit specialized welding requirements. *National Cylinder Gas Co.*

CIRCLE NO. 56, PAGE 21-22

Casting Design on Film

A new color filmstrip presents the broad fundamentals of foundry practice to design engineers. The 52 frames of the 35 mm film furnish the engineer with a series of basic design rules covering the advantages and economies in the use of casting to form metals.

Film is accompanied with 12 in. 33-1/3 rpm long play record. Running time 35 minutes. Produced by Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.

1956 AFS Book Catalog

The American Foundrymen's Society has published its 1956 AFS publications catalog listing 95 publications, including the society's 1955 Transactions.

Offered for the first time in this catalog are 15 bibliographies covering literature references on a number of subjects of current interest.

Copies of the catalog may be obtained from the American Foundrymen's Society, Golf and Wolf Roads, Des Plaines, Ill.

Yes, Sir!

Ever hear about the molder
Called Aristides Mc Boo,
Who got his buckets mixed up
And washed his mold with glue?
When they took it to the cleaning room
The casting stuck so tight
That to blast it loose, they had to use
Four sticks of dynamite
Yes, Sir!

And that new fellow over there,
The boys all call him "Hooks,"
Who claims he's a mechanic,
Though he learned it all from books.
His first day in the foundry
The boss took him to task
For sawing off a pattern
To make it fit a flask!
Yes, Sir!

A certain shop in Russia
Had a job so big—we're told
That a hundred men worked thirteen weeks
Just ramming up the mold.
And when they poured this monstrous job
They had two Russian gents
Riding 'round on horseback
A-touching off the vents!
Yes, Sir!

And it's said the Lower Slobbovians
Cast a job so thin
That they have to use a toothpick gate
To pour the metal in.
And when that casting wears out
At last, goes on the bum,
They use it for tin foil
To wrap up chewing gum!
Yes, Sir!

The green young buck who reads these rhymes
May curse and shout, "YOU LIE!"
But the older guy just shakes his head
And slyly winks his eye.
In metal casting shops you'll find,
When you've been through the mill,
That anything can happen,
And—give it time it will!
Yes, Sir!

From *Rammed Up and Poured*, book of foundry poems by Bill Walkins, former sand mill operator, editor of *The ESCO Ladle* of Electric Foundry Co., Portland, Ore.

Answer questions by sending for data describing the newest products and processes. Order by using the cards on **page 21-22.**

afs chapter meetings

JUNE

9 . . Toledo . . Toledo, Ohio. Annual Picnic.

9 . . Central Illinois . . Engineers' Club, Groveland, Ill. Annual Clam Bake and Barbeque.

28-29 . . 13th Annual Chapter Officers Conference of the American Foundrymen's Society. LaSalle Hotel, Chicago. sharp corners are reduced to a minimum.

30 . . Northeastern Ohio . . Twin Lakes Country Club, Cleveland. Annual Outing.

Investment Casting Course

The Investment Casting Institute will sponsor a six-day course in investment casting at the University of Michigan, September 10-15.

Because of the laboratory work which will be a part of the course, registration was limited to 40 persons and the enrollment has been filled.

The course has been arranged by Ted Operhall, president of Misco Precision Casting Co., and members of the institute's university liason committee, in cooperation with Dr. Richard A. Flinn of the College of Engineering, University of Michigan.

Ernst Loebbecke Otto Junker

In the May issue of MODERN CASTINGS we transposed the pictures of Otto Junker and Ernst Loebbecke, foreign authors who presented technical papers at the AFS Castings Congress. Pictures here correctly captioned.

advertisers and their agencies

continued on page 134

classified advertising

For Sale
Help Wanted,
Personals,
Engineering Service, etc.,

set solid . . 20c per word, 30 words ($6.00) minimum, prepaid.

Positions Wanted

. . 10c per word, 30 words ($3.00) minimum, prepaid. Box number, care of **Modern Castings,** counts as 10 additional words.

Display Classified

. . Based on per-column width, per inch . . 1-time, $15.00; 3-time, $13.50 per insertion; 6-time, $12.50 per insertion; 12-time, $12.00 per insertion; prepaid.

HELP WANTED

FOUNDRY SUPERINTENDENT—Excellent opportunity in medium-sized iron, brass and aluminum foundry located in the Southeast. Require superintendent with thorough knowledge of machine and floor molding, gating, sand control, both jobbing and production work. Applicant must know all phases of foundry work and be capable of producing pressure-tight and porous-free castings economically. Send full resume, picture, age and salary expected. **Address Box C134, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

FOUNDRY SERVICE ENGINEER for progressive research organization in gray iron castings field. Must have engineering training and at least five years practical foundry experience. Must be willing to travel and be interested in application of results of research to plant practice. Salary commensurate with ability. In replying give educational background, foundry experience, and brief biographical sketch. **Box C125, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

METALLURGICAL ENGINEER: Western New York gray iron foundry requires engineering graduate with experience to handle development and process control in the foundry and liason with those responsible for design and machining of green sand and shell molded castings. **Box C140, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

FOUNDRY METALLURGIST Development and service work involving moderate travel for large corporation producing wide variety of melting materials. Must have sound metallurgical education and wide knowledge of iron and steel foundry technology. Location, middle west. **Box C135, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

ONLY THE BEST We need competent metallurgist who likes people—therefore enjoys success in technical sales; who knows ferrous melting; who likes to guide his own destiny—therefore aspires to management; who is resourceful, imaginative, creative — therefore above average. Knowledge of tool, stainless, superalloys desirable. Home base will be Detroit area. Tell us about yourself and we'll do the same. **WAIMET, 1999 Guoin, Detroit 7.**

SALES REPRESENTATIVE. Aluminum, Bronze, Magnesium Castings. Should be well versed in foundry practices in Sand, Permanent Mold and Die Casting operations. Develop new territory with good potential. A fine opportunity for a well trained, ambitious person. All replies treated in strict confidence. **OBERDORFER FOUNDRIES, INC., SYRACUSE, N. Y.**

INDUSTRIAL ENGINEER. Expanding Industrial Engineering to foundry operations requires Industrial Engineer with 2-3 years foundry experience. Degree, MTM, and scheduling training desired but not limiting. Noncontributory surgical, hospitalization and profit sharing program. Send resume to L. L. Stouffer, Vice President, Pangborn Corporation, Hagerstown, Md. Mark correspondence "confidential".

BRASS FOUNDRY SUPERINTENDENT: Must have working knowledge of brass metallurgy, at least 10 years of permanent mold, die cast or sand foundry experience, under 50, salary open. Chicago area. Address reply to Box C139, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

SALES REPRESENTATIVE

Midwest Foundry Sand Company offers excellent opportunity for aggressive young man—age limit 40 years—to travel Midwest territory selling foundry sand. Must be experienced in all phases of molding and foundry operation. Salary and commission. Send detailed resume giving experience, training, education and salary requirements in first letter. Replies confidential. Reply Box C128, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

FOUNDRY ENGINEERS' Well established metal warehouse, handling foundry alloys has need for salesmen to call on iron and steel foundries in Midwest. Salesmen to work out of Chicago and Milwaukee warehouses. Address Box C111, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

SALES MANAGER

Familiar with stainless steel and high temperature alloys. Technical background preferred. Location western Michigan. GEORGE & DIX, Mgt. Consultants, Federal Square Bldg., Grand Rapids, Michigan.

PATTERN SHOP SUPERVISOR. A progressive midwest foundry that employs 250 men is seeking a qualified supervisor to take charge of its Pattern Shop and Storage consisting of about 20 men. Along with technical ability the successful applicant will require first class organizing and administrative qualifications. Age 35 to 45. In reply provide complete education and experience background. Replies will be held strictly confidential. Box C143, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

ENGINEERING EDITOR

MODERN CASTINGS

has immediate, permanent opening for engineering editor
Familiarity with metal castings and engineering essential
Foundry engineering experience desirable
Must be able to write rapidly, clearly, accurately
Job includes orginal plant writeups, rewrite, editing, some travel
State experience, education, age, salary requirements
Enclose samples of writing

MODERN CASTINGS, AFS Technical Center
Golf & Wolf Roads, Des Plaines, Ill.

POSITIONS WANTED

YOUNG COLLEGE GRADUATE with five years experience in ferrous foundry production and sales, presently with a large company but desires a position with small or medium size company. Prefers Chicago but will consider any location. Box C142, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

FOR SALE

FURNACES FOR SALE
10 used Heat Treating Furnaces, and two 7-ton gantry cranes, good condition, priced to sell.
BAER STEEL PRODUCTS, INC.
Box 1428
Boise, Idaho

FOR SALE One complete melting unit consisting of 2—No. 5 Whiting Cupolas with skip hoist chargers, 2—2½ ton receiving ladles, Roots blower and Foxboro air control. Capable of producing 7½ ton per hour. Cupolas equipped with front slagging spouts. Must be removed by July 15. Being replaced by larger unit. Address Box C141, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

1 G.E. 200 K.V. X-RAY
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obituaries

George A. Seyler, retired vice-president in charge of manufacturing and director of Lunkenheimer Co., Cincinnati, died March 3 in Florida. He had been retired since 1945.

Mr. Seyler was a national director of American Foundrymen's Society

G. A. Seyler

for 1938-41 and served as general chairman of the AFS Convention in 1939. He was a member of the Royal Order of Groundhogs, an engineering organization; Cheviot Lodge of Masons, and the Shrine and Scottish Rite.

S. S. Summers, Jr., assistant to the plant engineer, Texas Foundries, Inc., Lufkin, Texas, died from a heart attack February 25.

Whitfield J. Bell, retired Norton Company abrasive engineer, died April 2 at his home in Baltimore, Md. After 38 years with the company, he retired in September 1953.

Arthur A. McHardy, 60, founder and operator, Bay City Sand Co., Bay City, Wis., passed away March 29. He founded the business, which specializes in foundry sands, in 1919 after his return from service in World War I.

William H. Naegely, director of the laboratory, J. I. Case Co., Racine, Wis., passed away April 1. Mr. Naegely was a member of the American Foundrymen's Society.

Stafford W. Chappell, Jr., foundry superintendent, Electric Boat Div., General Dynamics Corp., Groton, Conn., died April 15. He was a member of the American Foundrymen's Society and a past president of the Connecticut Non-Ferrous Foundrymen's Association.

APEX

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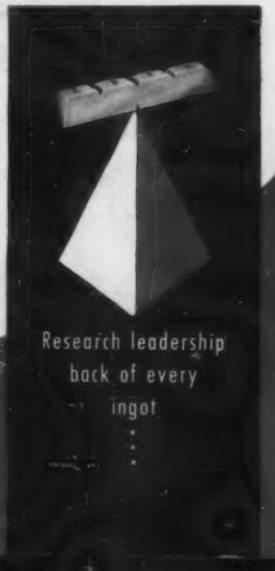

APEX SMELTING COMPANY

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modern castings, June, 1956

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